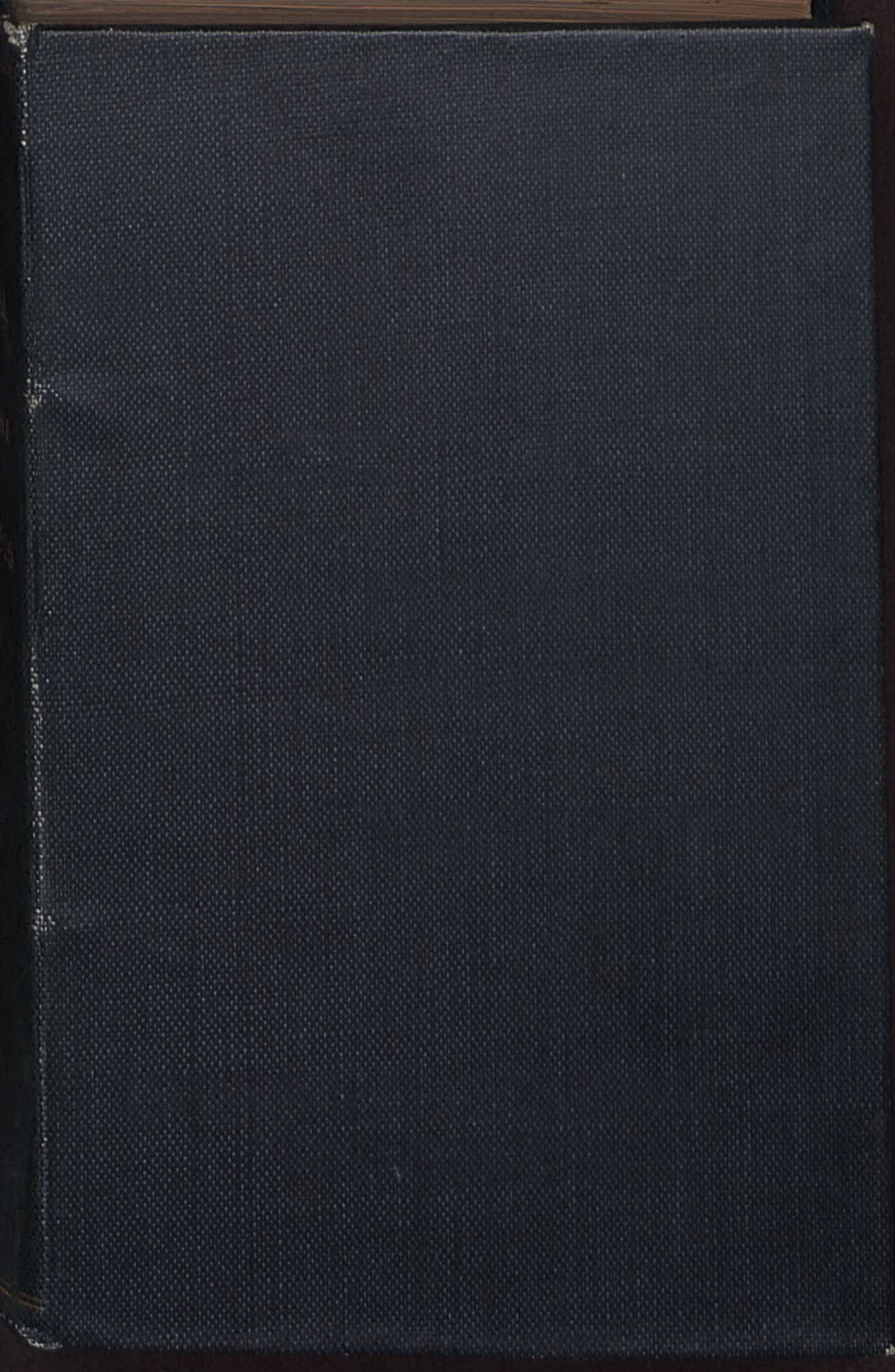




May 11 Tuesday 1915
Washington D.C. 2597
Saw Peter at the house. He
wanted to leave before I did
but not make General Pullman
traveling through to Colorado
State 40th. Could not try to
with.

FIELD JOURNAL

at in all large
dances. The system we were
into the Pischon of Pletique
Dagom. ———— still in bloom
here for a week more
the center curved day

ALEXANDER WETMORE

MAY 11 TO OCT. 24, 1915.

MAY 6 TO OCT. 31, 1916.

May 11, Tuesday. 1915.

Left Washington via B & O. at 4:05 P.M. Saw Petro at the train. He had expected to leave before I did but could not make. Secured Pullman accommodations through to Colorado Springs. Rate 40⁰⁰, could not buy a ticket farther.

Locust in blossom all along. Above Hancock MD. when we were rising onto the Piedmont Plateau much Dogwood still in bloom. Has been gone for a week near Washington. Country seemed dry but everything is green.

May 12 Wednesday.

cool and cloudy this morning with showers beyond Cincinnati. Ohio river and all streams very low. Leaves fully out though some may exhibit a more complete development later. Locust in blossom here also.

Many acer nequands along track. Maryland yellowthroats, yellow warblers, Song Sparrow and Meadow lark heard singing.

Have been reading Indicator of Significance of Vegetation in South Valley, Utah, Jour. Agric. Res. Vol I, no. 5. Page 370 gives a table of surface evaporation for water

at Nephi Utah.

Average for four years is

April	4.48	inches	min	3.54	max.	5.82
May	7.04	"	"	5.99	"	8.41
June	9.11	"	"	7.87	"	10.90
July	9.59	"	"	8.72	"	10.52
August	9.16	"	"	7.03	"	10.47
Sept.	6.14	"	"	5.59	"	6.69
Oct.	3.70	"	"	2.98	"	4.43.

In this table October shows a sudden decrease in evaporation. And from this may be deduced the reason for the decrease in Duck mortality in fall on Solera Lake. On that lake there is no sudden increase in water supply. During the summer months ~~the~~ evaporation from the free water surface would take place in the shallows as rapidly as in deep water. During the rapid evaporation of summer this would cause a concentration of salts in the shallows, the deeper water being less affected because of the greater volume of liquid present. With the lessened evaporation of October, the water would tend to neutralize the salt solution by natural flow and thus the concentration on the flats would be

decreased and the effect upon
the buds of this solution lessened.
This may hold true in limited
areas in Utah also.

Shower soon stopped and
before noon the sun was out.
Rather hot and quite dusty.
In western Indiana, Mourning
Doves appeared in considerable
numbers and through southern
Illinois other birds were common.
I noted numbers of Red-headed
Woodpeckers, several Bluejays and
Bronzed Grackles.

Arrived in St. Louis 6:00 P.M.

After supper took a hack to Ave.
Car transferred to Vandeventer and
went out to the Botanical gardens.
The grounds were open until
7:30 so that we had only
half an hour to look around.
They were very interesting; and it
is said that 11,000 species of
plants grow here. The gardens were
established by Henry Shaw in 1820
and were maintained by him
until his death in 1889. Since
his estate has cared for them.
Passer montanus has been
naturalized here but it was too
late for them to be about.

The following birds were noted:
Robin, Night-hawk, Oriole, Chipping

Swift, Yellow Warbler, English Sparrow
Catbird

Left St. Louis via Rock Island
9:06 P.M.

Saw one Green Heron this P.M.
Collected a number of *Stephylinids*
at the gardens in some plants known
as flowering Buckthorn.

May 13, Thursday.

The sun shining into the
window of my berth awakened
me at 5:00 this morning
and I finally got up at
six. Reached Kansas City at
7:35 A.M.

Heard my first Dick Cissel at
Spring Hill Mo. and from there
into Kansas City they were
common. The grass and trees
were fresh and luxuriant and
there have evidently been rains here.
After Breakfast rode out to Swope
Park and 50 minutes there and
collected a number of insects.

Tipulids of 3 species were abundant
in longgrass in shade. I had
no bottle large enough for them.
Insects were attracted to the
dill smelling flowers of the Crataegus.
The following birds were seen
Chipping Sparrow, three
Grackle several. Bluejay one

Bluebird one. Baltimore and
Orchard Orioles several. 7 ticks.
Robin, English Sparrow. Red headed
Woodpecker, Wood Thrush, Meadowlark,
Cowbird, Yellow Warbler, Crow, Mourning
 Dove, Cardinal.

Called up Scott Holloway &
Bunker on long distance. 7 I went
to Lawrence on the Santa Fe at
11:00 and I left on the Rock
Island at 11:35 a.m.

At Lawrence Scott and the
folks were at the station and
I was glad to see them. The ~~train~~
engine took water so that I
had quite a talk.

Kaw River very low. 1915

From Topeka on, on this
road the growth along the
creeks shows the influence of
the great Plains and beyond Clay
Center this influence was pronounced.
Elms and boxelds were the
prevailing trees with an occasional
sprinkling of Cottonwoods. Many of
the streams were men gorges,
steep sided cut into the rolling
growth and always the growth
was confined to their banks. Many
of the streams were dry. All
of the upland country is in
wheat.

Praxissels common. Saw Tyrannos

tyrannus at Clifton.

Very hot this afternoon.

at Belleville were at least two
Orchard Orioles in trees about the
station. Western Mourning Doves were
very common. I saw a dozen or more
flock but most were in pairs or
two or three together.

A night hawk was seen not
far from Belleville, at that station
was a male Robin in the
grass.

It was light enough to see
until 8:15. Went to bed shortly
after nine.

May 14, Friday, 1915

Woke this morning at five and
finally turned out at six. The
country from here on into Colo.
Springs was much like the plains
east of Denver. The road followed
the bed of a small creek for
some distance. At Ramah I saw
a number of Calamospiza melanocorys
& magpie was noted near here
and Western Meadowlark were
common.

Reached Colorado Springs about
8:05, A.M. thirty minutes late.
Went over town to see about a
pullman reservation and was
pleased to meet Prof. Lantz on the

street. I ate breakfast and then we started to hunt up E. P. Warren. We went first to the museum at Colorado Springs but did not find him. So went on out to his house. He had been down to meet me at the station but had missed me because the train was late.

Warren has a small house out in his yard that he uses as a museum and office and has it full of cases for skins and shelves for books.

He showed me a scheme for fixing bird skins for class use. He makes a skin with the wings and tail moderately spread and runs a wire from the base of the tail to the head letting the ends project several inches. This skin is then mounted in a square frame from $\frac{3}{4}$ to $1\frac{1}{2}$ inches thick by having the wire run through the end pieces of the frame, bent over and then stapled down. This supports the bird free in the frame. He then covers the sides of the frame with cellophane. This permits the bird to be seen readily from above and below but prevents injury through rough handling. A good scheme for the Audubon classes. I would

suggest an improvement in wiring
the wings to hold them out.
Warren had them fastened with
strips of isinglass.

Warren also told me of
Johnson's Ranch near Moun in
Baca county. Snow made some
records here for Kansas that have
never been adapted. This place is
right on the state line between
Colorado and Kansas. A small stream
with its bed ground with brush
and small stream run along
partly in Kansas and partly in
Colorado. Records made here might
readily be attributed to either state
and Warren said that he had
to be careful not to collect in
Kansas. He secured Beaked Thrail
there.

Warren also showed the skin
of a Buffalo of the so-called
Silk variety. This skin was
small and was apparently that
of a cow. The hair across the
shoulders and down the back
was soft very smooth fine and
curly much finer and softer
than another skin of this species
that I have seen. These skins
were very rare and were said
to have been prized by the Indians
who used them in ceremonies.

occasions.

Colorado Springs was a pleasant place with wide streets and good house. The water from the hydrants was excellent.

I left Colorado Springs via D. & R. G. at 12:40.

Sat in the observation car through the gorge and enjoyed it very much. The season was notably later in Colo. Springs and above than to the southward.

A gentleman who I met proved to be from Hazen, Arkansas. He told me that Hazen is located in a prairie country that is given over to growing rice. Wells are dug from 100 to 200 feet in depth and in these water stands within 20 feet of the surface. Dykes are thrown up around the fields and water pumped up to flood them. An impervious layer 12 inches below the surface keeps the water from escape below.

Rice is sown from April 15 to the first of June. At that time birds that from his description were Red-winged Blackbirds swarm in these fields in great flocks and destroy much of the seed. The grain ripens and is

harvested from August 15 until
the first of November. Again
at these times the blackbirds
come and do much damage.
If a field happens to ripen
earlier than the others nearby,
a large part of it may be
destroyed.

Some boys were hired to frighten
the birds out by shooting but this is
no longer done.

The ride up through the Royal
Gorge was much as on other
trips. I did not notice the altitude
at all going over Lemmon Pass.

May 15, Saturday.

Quite cold last night I spread
my rain coat over me to help
keep me warm.

Beyond Green River there has
recently been a little rain as
a few sprigs of green showed
on the slopes and flowers were
fairly common.

On going over the pass at
Soldier Summit I noticed that at the
top willows were barely beginning
beginning to leave out. The spring
here is slightly less advanced
than in the east.

From Cross to Salt Lake I saw
many yellow-headed woodpeckers.

Blackbirds feed in the Co. to.

Clear and warm today.

Reached Salt Lake City at 1:20
and went on to Ogden 15 minutes
later.

Reached Ogden at 2:45. Requested
at the office and after cleaning
up tried to find Mr. Kingston.

Mr. Van Ness Joseph Brown
and I could not locate him.

Wrote a short report on Blackbirds
Swimming Race in Parkman and
it in.

Mr. Thomas Trout arrived but
my report was missing.

The spring (1st water)
out north - little water. Grass and
sage in full leaf and the grass
was green and green.

May 16, Sunday.

Rose this morning a little before six,
had breakfast and then went out along the
Weber River, going up stream from the bridge
where the trolley to Salt Lake crosses.

The river was rather low for this
time of year it seemed to me. It was
running about as full as when I was
out here last October. It has a broad
gravelly bed and is in most places
divided into two or more channels. The
Balsam Poplars and Cottonwoods were in
full leaf. Numbers of flowers were seen

I was struck by the dryness of some localities in the stream bed, surprising to early in the season. There were spots with sandy soil raised 3 feet above the river surface and exposed to the sun. Grass was burned dry on them.

Other places with loam mixed with the sand, in places protected by tree growth from the sun's rays were moist and damp.

There was a heavy dew in the ~~low~~lands this morning though the uplands were entirely dry.

Along one bank that rose from the river to the bench above was an abundant growth of wild currant, box elder etc. This bank face was damp and moist through the run out of the ground water. The luxuriance of the vegetation was in contrast to the semi arid conditions elsewhere.

I collected quite a number of insects together some of them rather interesting. A number were the same forms that I secured last year. There were a number of other species however that I had not seen. They may acclimatize in this arid region as many of the plants do when the soil moisture is exhausted. The insects might be expected to do this as they are dependent upon the plants.

Many willows were in flower and various wild bee swarmed about them. In one small species the female was orange brown and the male black. The two ~~sexes~~ were seen in copula.

A predaceous fly (Asilid?) was hanging by its middle pair of legs (raised above its back) to a twig while with the other two pairs it turned about a small fly ~~the~~ into which its proboscis was set. The insect being suspended with its dorsum to the twig. Unfortunately it escaped.

A large very dark blue beetle larva was common on Chrysothamnus on the bunch. I thought that it was a large Meloid.

Birds were common but were mainly breeding individuals. A few migrant Pileolated Stelanderbous Warblers were seen and that is all. Probably a Mottaloomis seen was also migrant. 37 species were seen, most of them Passeriform species. ~~Ally~~ gnat were very common and I heard the males hooting constantly.

The sun was exceedingly hot today.

Returned to Ogden about 4 P.M.
~~Went to~~ Called on Mr. Bigelow and Mr. Neal in the evening but found them both out.

May 17, Monday.

Was up at six this morning
and some sitting and packed up
some insects for shipment.

Saw Mr. Bigelow at nine.

He told me that the lease for the
plot of ground on Bear River had
been signed and returned to the
Department and that I was free
to go ahead with the work.

I promised to let him see the
page proof of my preliminary report.
Went to Salt Lake City on the
10 a.m. trolley reaching there at 11.

Visited Mr. Lewis Mc Cormick's office
but found him out.

Saw Mr. Finch and Rogers and
Mr. Benson. Mr. Finch told me to
go ahead at Duckville and do as I
pleased. This year I am to pay
Haunch hire to the club instead
of Joe Cook.

Finch told me that in 1910 he
walked down the shore of No. 1
across Pintail neck and through
Teal Pass dry shod in ordinary
shoes. Along the channels there was
only an occasional pool of shallow
water. He said that early in the
season as it was dry the ducks
were very successful in their
nesting, and that on the trip
of which he spoke great numbers

~~young~~ birds half grown were
crowded down into the pools
far from shelter of any kind. and
that nearly all died.

I saw Mr. Chambaz in the
afternoon. He told me that there
had been hints that Dr. Fisher & I
had been "seen" to hold back a report.
He said that about Nov. 21 last fell
a big silo at the Garland Sugar
factory burst throwing about 100
tons of but pulp into the Malac
River. Chambaz personally saw
great masses of this pulp at the
mouth of Channel at Duckville
near 40 miles down stream. On
coming back to Corinne he picked up
11 Mallards & 6 or 7 Pintails helpless.
In my opinion these birds had eaten
the pulp and had been poisoned.

Fitch reported "mass" as just
starting on the flats at Duckville 3
weeks ago. On his trip up he visited
Hat Island where he found a large
rookery of gulls & pelicans. Bird Island
near there is only a small rock
and has a few on it and there
are a few birds nesting on Gardner's
Island.

Made arrangements with Schramm-
Johnson, 78 West end south to
purchase goods on Jan 5 & left an
order.

Returned to Ogden at 7:00 PM
leaving there at 8:00. Put in
a call for Joe Cool at Duckville
but failed to find him.

May 18, Tuesday.

This morning the sky was overcast and a drizzling rain was falling. Left Cedar at 8:30 for Corinne. Saw James Sundsen and Alex Moyes Deputy Wardens in Brigham. Arrived at Corinne 10:30.

The telephone to the Duckville Gun Club was out and I was unable to get the gun club all day to ask that a launch be sent up for me. It had rained very hard last night and cold rain fell more or less all day. It was very muddy and bad getting around.

Arranged with Will Bosley to visit the small laboratory at Duckville and saw about the lumber at the lumberyard belonging to Shaw.

Also asked Gillette to get some wire. 10 gal. milk cans are worth about 3 dollars.

Nothing much to do all day after this was completed but to watch it rain.

Corinne is going to have electric lights and a grist mill.

A large drainage project to the west of town will throw about 12,000 acres open to cultivation. The water will come from the mountains near Malad.

May 19, Wednesday.

This morning the rain had ceased though it was still cold and raw. Will Bosley agreed to send me down in his launch and I finally got away at 9:15.

In spite of the rain the river was low. At the landing stage it was four feet below what it ~~was~~ should be at this season. This is supposed to be the time of high water. The storm however that has run general over the valley will help out so that these waters will be used for a week or two at any rate.

Coming down the river I made as accurate a count of the ducks seen as possible. Nearly always the birds were in pairs and when flushed would circle behind us. Each pair ranged in a small area on the river from 40 rods to $\frac{1}{4}$ of a mile in length. When driven beyond this they always returned. So I kept count of the birds that flew ahead of us. I was able to get at the number with fair accuracy. These birds were mainly about to nest though Bosley says that he has seen nests of American Teal and young of Pintail at Corinne already this season. A few single males were seen on the river and these probably had mates that

were incubating. On the twenty seven miles from Coon to Duckville the following ~~seen~~ were seen. The number after each names is the number of pairs seen not ~~counts~~ the total number of ducks.

<u>Querquedula cyanoptera</u>	66
<u>Anas platyrhynchos</u>	16
<u>Chaulelasmus streperus</u>	15
<u>patula clypeata</u>	7
<u>Nafla acuta</u>	6

Six male mallards were seen in one flock. They must have been ~~domestic~~ birds.

Reached the Duckville from Clay at noon. The water here is low about two feet below what it should be.

In the afternoon I walked out along Channel 1 and as far as Pintail neck. The water on the flats was much lower than it was when I came last July. In fact the water was almost as far out as it was at the lowest season last summer. The flats east of the gun club that were covered with pools of water last year are now entirely dry. The colony of Avocets and stilts that nested there has moved down to Pintail Neck.

Although the water is low the appearance of the flats is much better than in midsummer. The water is fresh and contains

slightly less sediment. The flats
themselves are clean. All salts
have been washed from the surface
mud and there is no scum
over the surface mud. The ice
in going out this spring has
planed the surface of the mud
and smoothed it down. During high
water too the mud has flowed
and leveled up the chuck holes.

Botanogiton pectinatus is appearing
two or three inches in length.

Mosquitoes were bad.

On the evening it began to rain
and the thermometer dropped to 46°.

May 20, Thursday.

This morning I went out 2 1/2 overflow
and down No 2 to the mouth of
East Pass.

A count was made of the paired
Ducks along the overflow with the
following results.

<u>Anas platyrhynchos</u>	22
<u>Spatula clypeata</u>	4
<u>Marila americana</u>	5
<u>Anas platyrhynchos</u>	19
<u>D. f. acuta</u>	2
<u>Mergus americanus</u>	3
<u>Nettion carolinense</u>	3
<u>Erismatura jamaicensis</u>	1
<u>Chauleasmus streperus</u>	4

The water in the flats was
almost as low as in midsummer.
The mud however showed the
influence of the winter as it
was soft even where almost
bare of water. Potamogeton was
coming up in a few places but
the mud was practically bare.
The ice has removed much of the
surface.

The first four islands in the
mouth of east pass were examined
but no sick birds were found.
I found one dead goose, a female
in the overflow. It was old
and showed atrophy of the ovaries.
The bird was very thin and
had died from something other than

the duck malady. The stomach was filled with bulbs & stems of Potamogeton pectinatus.

The water on the flats showed fresher i.e. more nearly resembled the river water than it did when the birds were dying. All that I tasted seemed perfectly fresh.

In the afternoon I dissected the goose and scared for the birds on hand.

It was cold and wind more & less all day. The thermometer stood at about 46° until about 4 P.M. when it cleared and warmed up somewhat. Thermometer stood at 56° at 8⁰⁰ P.M.

On the flats were hundreds of Violet Green Swallows and a few Cliff Swallows. All circled slowly over the water occasionally picking up something from the surface. They seemed weak and often alighted on the mud or on bits of drift. Three Violet Green Swallows that I shot had rather low temperatures 105.5, 104.6, 103.3. Unless it warms up soon I am afraid that many of them will die.

May 21, Friday.

Today it warmed up somewhat. The sun came out and everything was bright.

Walked across the flats to

North Bay:

Carex is growing new shoots and a Salicornia (probably rubra) is coming up in abundance. Most of the Scirpus is dry and dead with green shoots just appearing. On the water along one bay however I found a number of plants in blossom. at a cursory glance this appeared to be palustris. I collected specimens of it. The old heads of Scirpus held many of their seeds still and form an abundant food supply. I wonder if the Blackbirds take advantage of it in the winter and spring.

The blossoming Scirpus heads were filled with a black thrips and a small weevil.

On the flats were many empty shells of Physa gyrina, limnaea palustris and Planorbis trivolvis.

The surface mud on the open barrens was saline to the taste and I found little pools that were saline also. This salinity will increase as the surface evaporation increases, the salts being drawn up with the ground water through capillary attraction and deposited on the surface.

It found considerable areas that had been covered with *S. cirpus* but of which only the ~~dead~~ root stalks remained their place being taken by *Salicornia*. Apparently as the water & content of the soil lessen the salt becomes too great for the *S. cirpus* while the *Salicornia* is enabled to endure a much greater degree of salinity. Surface mud ~~is~~ less saline in ^{growth of} *S. cirpus*.

The water in North Bay is only moderately high. It extends back into small bays for some distance and has been blown out farther by the wind.

There were many ducks in pairs out here about half of them being Redheads and the others Gadwall and Mallards.

There is quite a flight of Black-bellied Plover in now. I shot two fine birds.

The mountains north of Brigham are snow capped now and some snow shows above Ogden and farther down towards Salt Lake City. The Promontory Mountains are bare.

In the evening it ^{became} colder again and a severe storm swept up past Erism the whole landscape being blotched out in that direction.

May 22, Saturday

This morning the sky was
overcast. ~~at~~ At 7:30 a.m. the
thermometer stood at 46° F.

Walked across to North Bay and
made a small blind on a point.
There were a good many Black-bellied
Plover in and I wanted to get
a number for stomachs. Just as I
got settled however, a cold steady
drizzle set in and continued until
about eleven. The mountains were
obscured all around and it was
quite cold. With hunting coat and
boots I kept dry however except
for the legs. Only a few plovers were
flying and I got four pairs, birds
and some willow. I had made some
decoys of corrugated paper but it was
too wet to put them out.

This rain made quite a difference
in the flats. Little pools of water stood
about on the barrens and the ~~water~~
surface of the mud was smooth &
slight. This mud absorbs and
holds water directly on the surface.

No sick birds were seen.

Yesterday in turning over two
short pieces of board lying in the
Scirpus almost at the water's edge
I found three nests of Peewee Terns
and caught one an adult male.
The nests were small, 3 to 4 inches

across and contained merely enough material to form sides. The roof was formed by the boards. The material used was bits of shredded ~~scrap~~ stems & leaves. These animals ran quickly when disturbed. In one case two nests were found under one board and I wondered if they belonged to a male & a female respectively. One of these boards was moved into a clump of cane and today a complete nest was found under it. These mice make no runways. They must be able to swim. (As this area for a long distance is flooded in case of high winds from the north.)

About eleven it cleared and was warmer until evening when a north wind sprang up at 8:00 P.M. the thermometer stood at 50°.

This afternoon I had Bosley mark a ~~stick~~ stick 6 feet long off into half inches and placed it in the river at the end of the wharf. The top (first foot) came level with the top of the wharf.

At 8:00 p.m. the gauge registered 2 ft $\frac{1}{2}$ inch.

The water has risen 4 inches since I came down.

Mar. 23, Sunday.

This morning the sun was shining and it was warm. At 7:30 A.M. the thermometer stood at 52° . Water gauge 1 ft $11\frac{3}{4}$ inches. After breakfast I walked out along the river as far as the Bear River Club. Mosquitoes were very bad. The willows are entirely bare / out most of them have finished flowering. Other vegetation is well.

I found only one Duck's nest along here. That of a cinnamon teal. A few ring-necked Pheasants and Audubon's W. Geese were seen.

In the afternoon I made up some traps and went down to the creek & still along to get some pictures. Found one dead still in the grass.

Channel seems to be filling up. It is much shallower than last year.

The wind blew from the south in the evening and there was a strong odor of the lake in the air. A storm came up in the evening and the wind blew very hard.

May 24, Monday.

Water gauge 7:20 a.m. 1 ft. 11 ³/₄ inches.
This morning I packed up some
salted skins and went in to
Corinne.

Saw Fred Hansen on the way
up and met his son Alfred.
The latter has some very fine
mounted birds.

They told me that the banded
Birds shot by them were secured
on about the following dates.
Green-winged Teal Oct. 17 and 19
Pintail about Oct 24.

Spoonbill first part of October.

The river closed here last
year about December 3.

At Corinne - I found that
the river had raised about two
feet while at Buckville it
has come up about six inches.

Rain has prevented Bill Boosky
from doing his work here in Corinne
so that it will be a week before
he can build for me.

Schramm-Johnson, the drug firm
from whom I ordered some goods in
Salt Lake write me that because of
the new liquor law they cannot
ship alcohol into dry territory i.e.
to Corinne.

Left Corinne at 4:22 a.m. Sept. 25

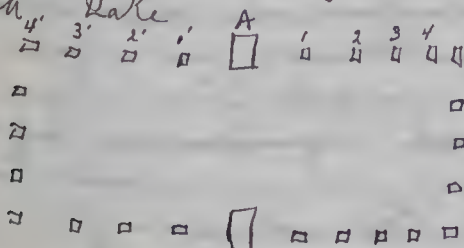
May 25 Tuesday

Made my first purchases in Ogden
first thing this morning.
Browning Bros allowed me a
discount on goods bought account
government service. I purchased 16
gal. Winchester headed shells at \$2.55
per hundred and Repeater shells at
\$2.35. They quoted me rubber boots
at \$4.90.

Went to Salt Lake City at nine
on the brother arriving at 10.

I saw Mr L. B. Mc Cormick. He told
me that water was low on
the New State gun Club grounds
and that only the channels
were full.

Deputy Warden Smith in
Chambers office said that there
was more water than usual
in Utah lake but that they had
not begun to pump from it as
yet. He described a method of
seining fish through the ice in and on
Utah Lake.



Holes six feet square are cut in
the ice at A and B.

two points being about 100 feet apart.
a rope is attached to a long
pole and started at A. The pole
is ~~run~~ under the ice at A
and pushed out at the little hole
1' the rope is drawn through and
again the pole is pushed through at
2'. This is continued around the
square ~~at~~ to B. The same method
is followed on the opposite side.
The net is attached to the ends
of the rope and ~~the~~ then pulled
through under the ice and
out at B. a loop foot net with
a pocket ~~is~~ used ~~and~~ lining
is done in from 5 to 6 feet of water.

Utah lake has no average
of a foot of ice during late December.
and the months of January and
February.

Dr. Stewart put his head in
the door while I was there inquired
concerning the report on Jack Wilson
without seeing me and then made
one or two uncomplimentary remarks
on what we knew about the matter.
I sat still hoping that he would
imply something more but he went
out then.

Mr. Chambers told me that he
has cut the season down on Sage
grouse to 15 days in September. So
late the season of this bird he has

opened the season in Mourning
Houses for 15 days.

Because of the new liquor law
Ed. Brown Johnson refused to ship
any alcohol to Corinne. One
law reads that liquor shall not
be shipped into the territory. So I
got two quarts and put them in
my suit case.

I had a purchase
in Salt Lake and then returned to
Eden arriving at 11:30. Saw Mr.
Bigelow at the Bank and he told
me that the lease for the tract of
ground on the Bear River Club grounds
had been signed & returned to him.

He then I talk with Mr. W. N. Marshall
Steward of the Bear River Club. He told
me that he had heard that the
snowfall at the head of Bear River
was normal but that cold spring
had retarded its melting. A considerable
head of water is being held in Bear
Lake for power plant use and that
may help out to some extent.

~~At 11:30~~ In the evening I called on
Mr. & Mrs. Bigelow.

May 26, Wednesday.

This morning I went to Corinne,
left Eden 9:15 arrived Corinne 10:27.

Will Bosley in Corinne tells me
that with two days of clear
weather the ground will be

enough to haul the lumber for
the laboratory.

Had a box from Schramm
Johnston by express. Got the mail and
left for Duckville.

Arrived at Duckville 2:00 P.M.

Boady says that there has been
a flight of Golden Plover & other shore-
birds in South Bay. He captured
one young one. It was
was gone. No sick ducks were
found out No. 4 or No. 2.

The river has come up an
additional six inches at Corinne
but at Duckville the water gauge
stands at 2 feet. Considerable
flood wash is running and the
water is muddier than before.

Collected two violet eyes Swallows
a Redwing and a L. J. Flycatcher
and made them up.

May 27, Thursday.

Water gauge at 7:00 A.M. 2 feet +
thermometer 50°. Clear and warm
all day for the first time since the
16th.

Took the launch and went out
Brown's Bay to North Bay.

The water here has come up about
three inches since the rains last
week. This was shown by the
Sampson (Salicornia ~~growing~~) in the

which was ~~growing~~ in covered
by water to that depth. Several
Sticks ^{avocets} were seen submerged
also. Others Avocets had built
their nests up to escape the flood.

Water in shallow pools was
distinctly saline here. Certain pools
were covered with a sort of
foam. Many bubbles covered the
surface continually giving off a
gab. ~~loose matter was held up~~. The
bottom of these newly flooded
pools held about $\frac{1}{4}$ of an inch of
loose flocculent matter with firm baked
clay beneath. In these pools
covered with bubbles much of this
loose matter was held at the
surface as I observed on dipping
up some of the foam. This of loose
mud had a strongly saline
and alkaline taste. This matter
held in solution or rather in suspension
would probably be eaten by birds.
On the mass of bubbles I saw hundreds
of dead diptera floating, a few live beetles
and some chironomid larvae. The beetles
were not aquatic. These insects would
form food in securing which birds
would of necessity get much of the
suspended matter strong with saline.
Water in flowing out across the
plate would become strongly
impregnated with the dissolved matter.

crusts of the same water would
be involved in flooding a large
area. That is the water in the
van would tend to continue in
the van and would cover fresh
ground until it could absorb
no more of the salts.

Two young wivets were
found affected by the duck
malady and two dead
birds (young) were noted. One of
the immersion birds, an adult about
five or six days old was able
to stand after drinking fresh water
from the overflow and as an
shown was entirely recovered. The
other an older bird was more
seriously affected. With these
shallow pools impregnated with
salts coming up around them
many of the newly hatched birds
will die almost at once.

The mud in the bottom of the
pools was strongly saline.

Not so many pairs of ducks
were seen today and the more
of the birds are nesting. We found
two nests of the Cinnamon Teal.

The banks of Browns overflow
have built up a great deal and
regulation along there is more
abundant and extends further
down than it did last year.
A large colony of wivets and

a few Stilts were nesting here.
Not many other birds were seen
in their immediate vicinity.
Carp were abundant.

There are thousands of a
large Sabams about now. They
swam into a new guide house
that Cook is building and I
caught a hundred or more and
fed them to the young Wovots.
The fish were rather stupid when
at rest and were picked up
easily.

May 28, Friday.

This morning it was clear
and the sun shone, until about
3 P.M. it clouded up. At 6 it began
to rain and continued at intervals
during the ensuing night.

Water gauge at 7:00 A.M. 1 ft 11 ³/₄ inches

Went out flow 2 and
crossed to Mud Point, continuing
around the point until I could
see far down South Bay, and

Many Cinnamon Teals, a few
Pintails, Mallards, Redheads and
Gadwall were gathered on No 2.
and were breeding in the rushes on
either side.

A good stream of water was
flowing out across the flats
and into South Bay. A northeast
wind drove a strong current
to the west.

Thousands of *Ephydra gracilis* were gathered at intervals about shallow skins of water on the flats. They formed black patches on the mud, visible at some distances. In these masses they moved about continually feeding and copulating. In feeding they forced the proboscis down into the mud and the surface in these places was ~~strongly~~ heavily pitted. Over these spots there were many casts apparently of excrement. When started they rose in clouds and settled on the mud surface to run and fly back to the certain spots preferred by them. These were all just at the borders of small pools, seemingly a certain amount of moisture content was necessary.

The mud here was very soft and was strongly saline on the surface.

Near Mud Point *Stamogeton pectinatus* was getting enough of a start so that rowing was difficult. The water here tasted perfectly fresh. I took a water sample here at Mud Point.

A good many dead ducks were seen here on the flats from last year. In many the fat had saponified preserving the bird.

Carp were out here in the shallows in great numbers and were spawning. The females swam back and forth depositing their eggs while the males swam beside them ~~rooting them~~ ^{roaring} them strongly in the side. One female that I shot contained more than a pint of eggs. They are tough and hard to kill. I shot this fish twice into its back where it projected from the water and then had some difficulty in securing it.

After dinner made up a few skins and then went to Hansen's in the motor boat. Fred has taken up some more land and has a good stand of wheat and alfalfa on it. This land occupies a low knoll, the last one of importance south of the river in going down stream. Grease woods covered it. Below was a growth of *Salicornia*, *Allenroffia occidentalis* and other salt loving plants.

The knoll has evidently been the site of an old indian encampment. In plowing bits of pottery and stone were exposed and at the edge of the barrens immediately below we found several arrowheads of chert. On the knoll were many bird bones, a few muskrat

bones and some of larger mammals. I gathered a large number of them. The fragments were mainly wing bones, bits of sternum and pelvis. Hansen held to the theory that there had been a coyote den here but personally I think that it may have been an indian kitchen midden. It is barely possible of course that hunters have camped here more recently but in light of the indian relics the remains are probably more ancient.

This country was surveyed in 1852 when the lake was down. Since then the lake has come up and again receded. Saw a small lot of Hares.

May 29, Saturday.

This morning the sky was overcast. Temperature at 7:00 A.M. 54° . Water gauge 1 ft. $11\frac{1}{2}$ inches.

By eight it was clear and very hot. About 4 in the afternoon it clouded over, rained a little and then cleared again. There was a beautiful rainbow with a complete arch after the rain.

Went down overflow and out across Pintail neck. Took a water sample in the flats in the shallows. Water $1\frac{1}{2}$ inches deep. The water here was perfectly clear and tasted fresh. Many Corisels

and a few Berosus. In ~~smalling~~
isolated pools were many small
crustacean Cyclops? These were
found also in the deeper water
with them were larger red free
swimming forms that were very
active. The water in the small
pools was slightly alkaline to taste.

Pintail Reed has grown smaller
since last year. A blind that formerly
was ~~very~~ ~~is~~ ~~set~~ lay out in the
water is now almost at the edge
of the mud flats.

Avocets were common and
from their method of feeding would
be easily affected by poison on
the mud surface. I saw them
feeding today by swinging the
head and neck from side to side
with a scythe like motion and
raking the bill through the thin
surface mud. In securing food
in this manner they must of
necessity swallow much mud.

With a south wind the
surf on the cut-off was plainly
visible.

Potamogeton was starting down
here.

In the afternoon I worked for
a while on skins and then
made up part of my May
expense account.

May 30, Sunday

This morning was up at four
and left at 4:45 for Corinne.

Wagon gauge 1 ft 11 in.

It was cold riding. I wore
a flannel shirt and a sweater vest
and this was not too warm.

The morning ride was beautiful.

For some time the mountains were
entirely dark. Then a faint rose
glow touched the tops of the higher
peaks on the Grosventory Range. Gradually
it extended down until the

whole range was light. A few
minutes later and the warm rays
spread over the entire valley.

Arrived in Corinne at 7:30

Got mail and my candy and
left for Ogden at 8:45.

Cherries are ripe now and boys
were selling them in the station at
Brigham. Arrived in Ogden at 10:45.

Registered at the Marion Hotel
had a bath and wrote a
considerable number of letters, 3 of them
being official ones.

In the evening went up Ogden
Canyon. The ride up the canyon
on the trolley is not very pretty. One
rush on either side prevents a
clear view while the slopes above
are hidden by the top of the car.
Had dinner at the Homage
House which had a beautiful

view of opposite slope. Behrensia
walked part way down. The larger
growth was made up of
Opulus balsamifera. a few Rubus
were seen on the higher slopes
but none were in the valley. All
were small.

mountain maple here seen
in places 15 feet high, highest than
I have seen it previously. Cornus
was common on the slopes
above.

July 31, Monday.

Went in to Salt Lake City this
morning at 6.55 via P & R. G.
The fare one way was \$1.10. And the
trolley to J. & J. is \$1.00. The trolley
company also make a reduction
to \$1.00 for the round trip while the
railroads do not.

Went to Schramm Johnson Co.,
and had a form 5 signed for the
chemicals purchased last month.
Also saw Mr. French and paid
for 3 boat trips due the club. He
charged me \$2.00 each.

Was at Salt air in the morning
and went in the water for half an
hour. Salt air lies about 15 miles
west of Salt Lake. The land there in
that direction is level with many
pools of saline water. Higher land
is overgrown with greasewood.
The inland Salt Co. has a large

salt works at the lake shore.
The salt water is drawn out
in great tilted off pans and
evaporated.

The lake here had a sand
bottom firm and fine. Much
of the algae Nostoc sp. was
floating in the water. The
bathing was enjoyable but not
so pleasant as in fresh water.

Returned to Ogden at 7¹⁵ P.M.
and worked until 12 writing out
my May expense account. Amount
\$12.67. Total expense for the
month about \$22.

Very hot this afternoon.
W.V.

Tuesday,

This morning a few necessary
purchases were made in Ogden and
then at 9:15 I left for Corinne.

Much alfalfa that has been cut
has been ruined by the heavy rains.
I noted Bobolinks near Willard
apparently ready to breed.

Strawberries and cherries were very
sold by boys a Brigham. The strawberries
here in Utah are among the largest
that I have seen and are fine in
flavor. They are selling now at 2
boxes for a quarter. Selected berries
average two inches in diameter. The
little wooden boxes are the
usual ones in this country.

arrived in Corinne at 10:27.

Snunclay & made arrangements with
Ken Rowe to haul the lumber for the
temporary laboratory to Kundsens Club.
He took one load yesterday and
the last of it today.

About noon a heavy storm
came up with strong rushing
rain and some hail. Men told
me that this was the most
-one rain storm that they had
seen in Utah. The hail was small
and I do not think that it
would do much damage to young
birds.

One man in Corinne complained
that the magpies were killing off
many of his young chickens.

Left Corinne at 4:00 P.M. Had
1200 lbs of dynamite aboard besides
some other things.

Arrived at Duckville at 8:00 A.M.
of swim. Had intended to pick up
my lumber on the way down
but could not make it.

The water gauge registered 1 ft.
11 1/2 inches this morning.

It had rained heavily here during
the afternoon.

June 2, Wednesday.

This morning we pushed the flat
boat up to Kundsens and loaded the
lumber piled there into it and
brought it down to Duckville.

north wind blowing make it
difficult to handle the flat boat but
finally we got in with it and
by hard work managed to get
the matched flooring and timber
in before a heavy rain came up.
When the rain stopped about
three o'clock I made a gate into the
enclosed space where I will place
the building and poled the flat
boat up to the boat house. Will
pile the heavy logs outside as we then
will not hurt them.

This the rain today came much
harder than will be very hard on any
young birds that are out. During
the course of the hail storm not a
bird of any sort was in sight.
~~Some~~ all had found shelter. With this
rain the thermometer dropped to 48° .
It did not warm up again
during the afternoon.

Several evening rain storms came
up all around but did not strike
Duckville.

The river remained at the same
level until evening in spite of the rain here.
It is so high now that it takes a
great deal of water to raise it. At
Corinne yesterday $8\frac{1}{2}$ inches of rain
fell without affecting it.

June 3 Thursday.

This morning went to the mouth of No 3 with the motor boat and then rowed down the bay to Slaughter Point.

Water gauge 1 ft. 11 inches. It was clear all day but with a strong north wind.

On South Bay were two large flocks of male Pintails with a few mallards. No females were with them at all. These are birds that must have completed the moulting and deserted the females. One male that I shot had the sexual organs fully developed. The plumage was rather worn. Along the banks of the overflow were a few dead ducks, mainly Pintails and green-winged teal. The larger part of these were left from last fall but a few are birds that have died this spring. One fresh dead bird showed signs of having been shot.

There were of considerable growths of a yellow buckwheat and dock on the banks of the overflow and willows have taken root in a number of new places.

Large areas of newly flooded mud were very soft. The water here has come up recently nearly 3 inches.

Past mud point Potamogeton pectinatus is making a good start being much more abundant.

in growth than it is farther up in the bay.

large numbers of Carp were gathered in here and were feeding on the Potamogeton. Little sprigs of the plant came floating down with the current. These fish must destroy quantities of the Potamogeton. The carp were seen often with the back half out of water. As we passed they became alarmed and shot off through the shallow water making great waves. Several attempted to pass under the boat and ran along the side rooting it with their noses and splashing water on us.

Back of S. Caughter Point in the marsh was a breeding colony of ibis, Snowy Heron and a few great Blue and Night Herons.

good many ducks were seen far down the bay among them a few greater Scaups.

One Great Pelican was seen lying on a mud bar. ~~It was~~ Two helpless birds were picked up. One was lying on its breast on a mud bar and the other floated on the surface of the water below S. Caughter Point. They were unable to stand the legs being entirely helpless and they had little use of their wings. They struck out with their bills but without much effect. I built up the blind on S. Caughter.

point and not is it for awhile
but did not see much. I saw
Ruddy Ducks swimming by and
numbers of Sooty Herons were feeding
off shore.

There is a strong sweep of
fresh water in here now ~~and~~
fullest deep enough in the center for
the launch. The water was
clouded with silt from the river and
was not clear up it in places.
The north wind brought down
a stronger sweep of water
and in going back we drifted
badly. It took about an hour
and a half to come back to the
mouth of the bay.

Large flocks of Pelicans were
seen over near Lady's Island.
One bird resting in the water
could fly only with difficulty.
The two helpless birds raised
the head often in gasping for
breath. I gave ~~them~~ each a
little water. When water was placed
in the front of the pouch the spitting
closed immediately. They did not
seem at all anxious for water.

At the gun club I put the two
pelicans in a small pen. One of
them died during the afternoon.

Clear & warm until evening.
Ezra Sackett came up in the
afternoon and was here until

in the evening.

He told me that this year the ice on the ~~bays~~^{river} began to go out February 22. The bays have been flooded somewhat over the ice previously - the Ducks began to come in at once and in two or three days sick birds were noted. In March there were a good many sick birds & Sackett said that there was burning off the rushes in order to make ~~and~~ fresh cattle feed next year. After the fire had passed birds were found still alive with nearly all of their feathers singed off. Pintails, Green-winged Teal, Mallard, Widgeon and other ducks were affected.

Sackett said that many birds ^{ducks} wintered on a stretch of open water fed by warm springs near Honeyville.

He saw Skunk tracks on Hansen's Island last year. He knew of Blue-winged Teal occurring in this region. Last season he trapped 500 muskrats.

June 4, Friday.

This morning I went down 3 1/2 below Sackets and crossed into the old River channel through Neely's channel. Water gauge 1 ft. 10 1/4 inches.

This channel was blown in here last fall with Dynamite and was running

a strong stream of water. I was
raised to the level of water in the
old river bed at least four inches
during the recent high water.

The old river bed here is a
channel broader than the river itself.
It can be waded with hip boots
in most places and has a thick
growth of Potamogeton & moss. Formerly
its only connection with the
bays above was a narrow channel
or run leading into it from
North Bay. I rather wish that
it had been left alone so that
I could have studied conditions
~~in~~ in a channel cut off from the
main body of water here. Lots
of long sticks & crows, were
nesting down here.

Hansen's island is low and
level - away from the flow 3 1/2 x 4
there are no willows. Small ponds
at either side are just by inlet
from the main channel. This channel
is undoubtedly very old. ~~May~~ The
connection with the river was severed
near Sacketts and the old channel
has not been silted in as ~~so~~ little
water has come into it except
through Suptage.

In the afternoon I had Bosley
check up the lumber.

Skinned & dissected the two
Belians secured yesterday.

June 5 Saturday.

Water gauge one ft $10\frac{3}{4}$ inches
thermometer $50\frac{1}{2}$ at seven A.M.

Several small showers passed over
during the forenoon but on the whole
the day was clear. In the evening
great cloud masses piled up on
the Wasatch range. In one place
there was a spot of red color color
as of a fire with a patch of bright
green above. At first I thought it
was a rainbow effect but finally
decided that it was due to reflection
on the clouds.

With the motor we went
down to Bens overflow towing a
row boat and then rowed down
to Slaughter Point. A strong
southerly wind blew all day long.
At least 600 Pintails with
a few mallard and spoonbills
all males were banked up
on the flats standing quietly on
the mudbars. I saw two mallards
in a pool back of Slaughter Point
that were beginning to molt on the
body.

At Slaughter Point is a great
area covered with Bulrushes, tules
and Scirpus growing in water from
4 to 18 inches deep. In these
large numbers of Snowy, Night
Great Blue Herons and also

I collected three or four young birds and took a considerable number of pictures. The drab circle I overhauled continually but the Herons were gone away. The Snowy Herons especially took care to keep out of range. Great numbers of Yellowbilled Blackbirds were gathered in here to breed also.

Back of Slaughter Point were some large ponds with water & mud in them a foot or so deep. There have been sick birds in last year as I saw a few still lying in the rushes. I gathered a few of these supposed ducks and also collected some muskrat skulls from holes that had been skinned and thrown aside last winter.

I noted a Pintail that was ~~new~~ recently fresh.

Two Pelicans were seen that were somewhat affected but were able to fly. Yellow chickadee was common on islands down here.

I found a black thrush abundant in heads of the tule and collected specimens.

Returned to the gun Club about four P. M.

June 6, Sunday.

Today the sky was clear and the sun shone all day. In the

afternoon it was hot. Mosquitoes
and gnats were very bad. I
was making up a few skins
in the afternoon but about 5:30
had to stop because of the insects.
Water gauge at 7:00 a.m. 1 ft. 10 in +

After breakfast I walked up
the river along the willows as
far as the Bear River Club. In
spite of the rains the ground
was parched and dry and the
grass was beginning to shrivel.
Did not find a single Duck's
nest.

Last year the water raised
late in May until it stood
about a foot and nine inches
higher than at present. This drove
out the breeding birds below and
large numbers of ducks came up
along the river to nest. Today
I did not find a single nest,
showing the difference in conditions.

Birds were fairly common.

Last night I shot a Redwing of
her that had not assumed the
adult plumage. Her shoulder patch
was pale and clouded with black
while the dorsal feathers still had
many light tips remaining from the
winter plumage. This bird had the
testes moderately developed and
far from breeding size. I have seen

birds similar to this before notably
in Wisconsin (May 30) and
have considered about them.
she may be

1. Old males that have lost
much of their virility.

2. young males that require
two years to become adult.

i. e. birds that are bachelors
during their second year.

3. Birds that have been injured
or sick and so have not become
sexually active this year.

The second hypothesis seems
the more tenable and I am
beginning to believe that a large
part if not all of the males
require two years to become
adult. they may or may not
breed during the second year.

I shot a Western Wood
Pewee in the willows here and
believe that it was a migrant
as the sexual organs were small.

Last night I shot two night
hawks and consider them as
migrants also.

From the Bear River Club I
took in a launch with Webb
& Peterson out Brown's Conflow.

Two sick gadwalls were seen
near the mouth of the conflow
and Peterson who I had in waders

caught ~~them~~ for ~~them~~ m. One
was the ~~is~~ ~~live~~ - hot ~~chances~~
but the ~~the~~ could not remain
under the surface. I brought
them in and placed them in a
small pen for No. 1. I had
expected to find sick birds here
as soon as anywhere. Last fall
when the water caused the
last outbreak of this malady of
any moment ^{for this year} came at the mouth
of Brown's Couflow when the dry
flats were covered with a shallow
skim of water. These conditions
have been repeated now
(see journal for May 27). There
is this difference however. The
ducks are scattered now and
are in pairs ~~so that~~ keeping mainly
to the channels and margins.
When they will be in flocks on
the mud flats and in feeding are
much more liable to be poisoned
than now.

I collected a few insects
today but did not find much
of moment. I found most of
those collected in lush growth
near the water. The dry parched
grass yielded little. No adult
Cicadellids are present here now.
A pale thrips of small size was
taken on blossoms of grey willows

June 7 Monday.

This morning Colok went in to Corinne in the canoe. I sent for animal salt and wheat.

After Breakfast with Bosley rounded down the river to Sacketts and went out No 4 into North Bay. No. 4 has filled up considerable during the winter and is badly choked with bulrushes and tules. The water has raised here and is fairly high now. In low water it will be difficult to get through. Diak no 4 was filled with fresh water. The flats south of

the mouth of 4 were flooded. The
water has come up four inches.
here. All the newly flooded lands
now are covered with fresh
water. The Rushes back of
Mallard Point were burned down
last year - and now are growing
abundantly. At the water
edge for about twenty-five feet
the flood is ~~25~~ 8 feet tall. Farther
back when the water was less
they towered until they were
nearly high - they are
alternated with clumps of Ints.
behind them was a growth
of Scirpus.

Elvis & I now have had
just come in here and were
starting a rookery. I found
one Elvis nest containing an
egg but elsewhere the rushes
were bent over to form the
foundations.

The sky was overcast today
but it was warm.

Water gauge at 7:00 a.m. 1 ft. 10 inches.
an argument against a ptomaine
theory is this: why ptomaine coming
from sugar factory waste that
might affect the birds would
be certain to kill the fish. There
is no mortality present among
the carp.

June 8, Tuesday.

This morning at seven the
water gauge stood at 1 ft. 10 $\frac{1}{4}$ inches.
The sun shone all day and
the mountains were almost hidden
in a haze. Found it very warm.
In the morning I took the
canoe and went up the river
going out Knudsen No. 1. This overflow
is also known as Pilla's overflow
named after a young lady
Orilla Knudsen. Knudsen No 2
is called simply Knudsen.

The water has come up here
more than four inches and
has flooded considerably areas.
In several places where the
scum on the surface formed
by rising water. A great body
of water comes out the three
big overflows into North Bay; it must
represent ~~about~~ more than one third
of the volume coming down the river.
The Avocet and Shells have
built their nests up 10 or 12 inches to
escape high water.

I found one sick Mallard
a bird almost helpless. It was
a male beginning to molt a little.
~~Another~~ ~~about~~ ~~adult~~ was found
also and I saw 4 dead young about
another Mallard was reported to
me here and I saw one gadwall.

it hardly work for much more doubt
here until another change in
water level comes.

There was a very large colony
of about 9 still here.

Returning we went down
Brown's Clouflow. The water has raised
more than an inch here above what
it was on my last visit.

A sick about adult was found
here.

The foxtail grass is in seed now
and is very handsome. I did not
realize how much of it grew on these
flats. The dock Rumex seems able
to grow even when flooded. I
noticed however that it sends out
many fine roots that extend out
into the water from the base of the
plant and tend to reach toward
the surface. Some of the Dock is in
flower now. On the heads were
many dark blue Chrysomelids
Gastroschia and two species of
Occinellids.

Tried to make a paraffin
embedding apparatus from a 4 inch
flask. Both flasks that I had
however broke while cooling after
they had been heated.

Found a location in No 1
for some large pens this evening.
Am afraid that No 1 will go

dry this summer.

In the evening I took some letters up to the Bear River Club to be sent out to Brigham in the morning.

June 1, Wednesday.

Water gauge 7⁰⁰ a.m. 1 ft. 11 inches. Clear nearly all day though for an hour or two a haze obscured the sky in the morning.

After breakfast we went down No 20 and crossed to East Pass, worked down through East Pass examining several of the islands. There had the *E. cirpus* growth covering it dead. No trace of sick birds was found down here.

Going on down we followed on down through the rat trail and past Bond's Pond. Growth of *E. cirpus* was on either bank - 26 the least the ground was fairly solid enough so that hunters may camp here in October. The water at the end of east Pass was shallow and hard going.

Below Bond's Pond I could look out across the marsh to the east and southeast and see the Willard Spur. For sixty to 100 feet on either side of the channel that we were following the sedges were green and flourishing. Beyond that they were

all dead kill. by the salt.
This growth of dead Scripus
extended clear down around
Klondike on an extensive area.
Water in pools when it was not
discolored had the peculiar clear,
heavy appearance that the lake
water does and to the taste was
intensely salt. There were large
numbers of Willet in here and
a few stilts even nesting. They
can now expect to raise young
here on this saline water.
Some had nests in the edge of
the salt grass toward the
spur.

Beyond the dead Scripus was
an open barren ~~leading to~~
reaching to the Willard Spur
occasional patches of Distichlis
spicata grew near its inner
border and little ~~low~~ islands
of living salt grass were found
through the dead Scripus farther
in. Pools of salt water ~~was~~ were
on the Barren and a mass
of some sort heavily encrusted
with salt was found here. It
did not go far out here as it
was late. ~~and~~ Dead birds from
last year were strewn about.
All over this Barren the
bulbous roots of the Scripus that
had formerly grown here had

washed out and been piled
up in little heaps containing
half a bushel to a bushel all
over the flats. These were strewn
about all over the flats and at
first I was at a loss to
account for them. Finally I decided
that they were thrown up
here by the water.

I spent the afternoon in caring
for skins etc.

Called Will Bosley up long
distances at Corinne and he
said that he thought that he
might be able to get down tomorrow
to start my laboratory.

June 10 Thursday.

This morning at 7 the water gauge
registered 1 ft. 11 inches. It was very hot
and close all day.

Went down number 1 this morning
and put in most of the forenoon in
watching avocets & stilts on the flats.

There were numbers of carp
spawning and feeding in the flats.
Below where they were feeding I
found a great deal of floating bits
of roots etc. that had been
blow up by them. The water was
roily all about here. I killed
one large female by striking it with
a stick. When followed the fish
get into the deeper parts of the

Channel and lie motionless picking
among the Polamogiton.

In the afternoon Will Bosley came
and we started in at once on the
Laboratory. We laid the floor and
raised the frame for the south side
by 8 P.M. Mosquitoes were exceedingly
bad.

June 11, Friday.

Will Bosley and I were at
work this morning until 4:30
and continued until 5 in the evening.
We put up the entire frame and covered
it with rustic but the rafters and
put on the roof boards and part of the
roofing.

It was cold this morning
Thermometer stood around 43° and
rain threatened all day. In the
Wasatch mountains were several
snow storms and occasional showers
fell at Duckville. Water gauge this
morning 1 ft $11\frac{1}{2}$ inches.

There were a great many
Violet green and Cliff Swallows flying
down from the mountains and it
was so cold all day that I
wore a sweater and a heavy
coat while working hard.

Early in the morning birds were
very active but became less
active later on in the day.

June 12, Saturday.

Water gauge at 7:00 A.M. 1 ft. 11 $\frac{1}{8}$ inches.
Was up and at work in the laboratory
at 4:30 A.M. and worked until 8:00
in the evening. The roof was finished
the door hung and the windows
put in - the table was built also
and the freeze board completed.

It was cold all day with
a raw wind. The thermometer
stood at 43° at 4:30 A.M. and
did not rise above 50° all
day. A cold wind blew and
storms circled all around the
hills. Above Willard considerable
snow fell in the mountains. Several
rain storms passed over Duckville
but none of much importance.
The wallpaper was hung put for
food today and put in most of the
time today pushed in the telephone
& once wire with fathoms ruffled up.

June 13, Sunday.

Was up at 4:30 again this morning.
Somewhat warmer. Water gauge 1 ft 11 $\frac{1}{4}$ inches.
The laboratory was entirely finished
today, windows screens and all.
And Bosley (Will) went home this afternoon.
Counting 4 hours spent in going and
coming in his launch on the river
and one hour in figuring the
lumber bill for the building he put
in 49 hours of work for which

he charged me \$5 cents an hour
making \$22.05 for labor. His
board came to \$6⁰⁰.

I have had Ray clear out
the small brush among the
big willows just outside the
north windows, to the river's edge
to make a landing place and
give a view of the river. We
dragged the brush away and
piled it up on the garden. All
theavings in bits of wood were
taken away and any lumber
that we could use was
piled up under the willows.

I moved my stuff into
the building at once and
got most of it unpacked ~~at~~
before dark. I am very well pleased
with the building and think
that it will be tight and
comfortable.

Telegram from Dr. Fisher today
from Pendleton Oregon saying that he
would arrive here June 15.

June 14, Monday.
Finished cleaning up around
the laboratory today and got the
rest of my stuff unpacked. Everything
is in good shape and ready to
start work. I had Booby scrub
over our small pens and

them on the floots beyond the
lab. on the salt grass outside
the willows. I got out two
of the nets for capturing ducks
alive set them up and
repaired holes in them. This took
me some time.

At this we took the small
launch and went down to
Bens Overflow. At least 500 Pintails
with a few spoonbills and mallards,
all ducks were resting here on
a small open square. I put up
two nets here baiting them
with wheat.

Water gauge this morning at 7
1 ft. 11 1/2 inches. Very hot today.

June 15, Tuesday.

Water gauge 1 ft 11 3/4 inches.

Left Duckville a few minutes
past seven and went in to
Corinne with Cook to meet
Mr. Fisher.

Conditions along the river were
about as usual. Near Christiansburg
I saw a great field of wild
mustard in blossom. Wild
Rose is still in bloom. It
lasts here a long time.

Saw & haw in Corinne and
got the bill for lumber. It
came to \$95.35 but included
\$14.10 for lumber for Ben.

The total cost of the building was but \$120⁰⁰ or 30⁰⁰ less than estimated. A large part of this was saved on labor as I had allowed 30⁰⁰ for labor and 12 for subsistence while those amounts were \$22.05 and 6 respectively.

We had dinner in Corinne and left Duckville about 4³⁰ P.M.

Mr. Fisher and I walked down to the river and collected some insects. I saw only one adult cericid and it escaped. Nymphs were abundant.

Under board I found an miniature microtus in a small nest that resembled that of Reithrodontomys. The mouse was dead. The skull was kept. The nest was composed of very finely shredded material.

I put it in the late afternoon and in coming in showing Mr. Fisher the laboratory and talking over the work with him. Mosquitoes very bad. Ephemera furcata seen this evening.

June 16, Wednesday.
This morning was up at six. The day was clear and very hot. Water gauge at 7⁰⁰ 2 feet.

after breakfast Pooku and I took
Dr Fisher in the launch out Ben's
overflow and then rowed down
to Slaughter Point and Slaughter Island.
Great numbers of Pintails were
gathered on a small strip
flat at Ben's overflow. They are
moulting considerably now. The
wheat was eaten away from
in front. The nests here but
that inside or within the wings
had not been touched. She
that here was spotted with
black excrement. I noticed that
in about 1 out of 4 the droppings
were loose and white indicating
some affection perhaps of the
duck internally.

The *Polanogiton fructuatus*
shows great growth and
corns large areas. buds are
appearing upon it. ~~With~~ On the
opposite side, held by the ~~mass~~
Polanogiton were great areas of
yellowish green moss.
Carp were abundant in the
bay.

We landed at Slaughter Point
and went back inland through
the fern country. The water here
in small pools was clear
and slightly sickening. There were
many coxixits in it.
I picked up one sick coot

her unable to fly though it
could run swiftly. She found
was put in the boat but
escaped.

After eating lunch we went
on down to Laughter Island
a Scirpus Island 40 yards
in diameter. On the southern
half the Scirpus growth was
dead probably from salt water.
There were great numbers of
alkali flies here and evil smelling
areas of black mud giving off
a strong odor of Hydrogen
Sulphide.

There was a large
muskrat house here and while
sitting on it the whining of
young was heard beneath. We
piled up and found 7 young about
8 inches long including the
tail. The eyes were closed the
animals were only able to crawl
about. They were covered with
a growth of brown hair. The
heads were large with great
blunt snouts. The tail was
round and rather short with
a slightly indicated lateral
compression near its base.
One that I placed carefully in
water was unable to swim.
It was incapable of holding

the large head bore the surface.
The rain over the sheet water
well. The plot was
cavity 12 to 14 inches across about
six inches below the top of the
mound.

Returned to the gun club
about 4 and made up a
number of Kins type slat.
Mosquitoes were very bad
this evening and made
a screen windows a necessity.

June 17, Thursday.

Ship morning at 7 the water gauge
registered 2 ft $3\frac{1}{4}$ inch.

Today we took the launch to
Nahys canal on $3\frac{1}{2}$ and then
rowed down the old river channel
for several miles.

It was very hot today but
a breeze that tempered the heat
somewhat.

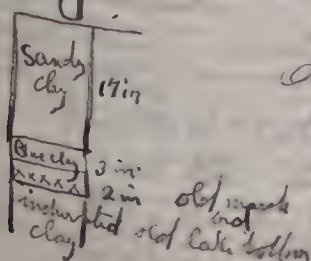
For the first 2 miles the water was
cloudy showing the influence of
the river water but beyond it became
almost clear. There were great growths
of Potamogeton pectinatus here filling the
entire channel in most places though
a few open places were noted. With
this were masses of floating
a yellowish green moss that clogged
the progress of our boat.

In most places the channel averaged $1\frac{1}{2}$ to 2 feet deep. We struck a few shoals where it was barely 8 inches but not many.

The banks of the channel were low with growths of salt grass Distichlis spicata bordering them. These were succeeded by a narrow band of Balicoma integrifolia toward the margin of which grew a few plants of Kochia verticillata. Beyond was the alkali barrens varying in width. The barrens were succeeded by wet places covered with Scirpus palmosus.

at one place I saw a large area where the rise of salt in the soil had proved too much for the Scirpus and all the plants had been killed. The surface soil here was strongly saline.

Not far from the old ferry boat of dug a hole at the edge of a barren that extended white with alkali for half a mile.



The first 17 inches was a deposit of sandy clay soft and moist that has been laid down recently by the river deposits. Below this was a true blue clay. Beneath this was a two inch

deposit of great interest. It was
the old bed of a marsh with
the bulbs of *Scirpus* and many
triangular stems preserved in it.
The bulbs were easily broken but I
got out a few entire. Stems of
Scirpus ~~some~~ inches long were taken
out entire. The soil deposit in which
these stood was a clay black
a true palustrine deposit. In it
and just above the *Scirpus*
were great numbers of shells of
Physa gyrina, many large *Planorbis*
trivolvis and a few ~~smaller~~
immense numbers of a small
Planorbis $\frac{1}{8}$ to $\frac{1}{16}$ inches in diameter
that may have been immature
shells of the same species. With
these were a few dipterous pupal cases.

June 18, Friday.
Water gauge 2 feet 1 inch.
Packed up a few specimens this
morning and with Mr. Fisher went to
Corning about 10. We stopped for
a few minutes at the Bear River cut
and then went on. I was very
hot today.

Reached Corning about 1:30. Had
dinner at the hotel and then
saw Mr. B. M. Shaw in regard to
the lumber bill for the Laboratory.
Left for Brigham about 3:20.

Mr. Pearson of Corvallis ~~visited~~
Mr. A. Lindy ~~was~~ going to establish
a gun club off Salt Creek. They
visited Dr. Fisher to examine the
grounds but as he did not have
time he delegated the job to me.
We reached Uggden about five
in time to clean up before dinner.
A ground mart in Corvallis with
instructions to secure specimens for
an exhibit at the Oregon farming
Congress in Denver in September.

June 19, Saturday.

This morning called upon Mr. G. P.
Bigelow with Dr. Fisher. Mr. Bigelow says
that Mr. Davis is clearing out the
Canal bringing water into North Bay.
Very little was said regarding my
report.

After leaving here we went into
Browning Bros and ordered
500 16 gauge shells #6 and 200 No. 8 shot
to be sent to Corvallis by express.
Last night I found that I could
spare \$100 on my authorization for this
year and Dr. Fisher wired Mr. M. A. Allen
to that effect.

Dr. Fisher and I had lunch
together and then I went to Salt
Lake City at 1:10 on the Oregon short line.
Took Mr. Fisher's trunk with me and
had it transferred to the Cullen hotel in

Salt Lake City.

Went to Schramm's and ordered
some needed chemicals and purchased
a water bath, stand & rings and
some other laboratory supplies at the
Min and Metals Supply Co.

Called on Mr. Chambers, game commissioner
but found him not in. Left a note
saying that Dr. Fisher would be in
Salt Lake City next week.

Returned to Ogden via the Cambridge
electric, reaching there at six P.M.
Mr. Fisher left for the west at 5:40
P.M.

On the evening I called
George Parkin at the New State Gun Club.
He said that he had seen no
sage birds this season. The water was
low however so that today they had
turned the water out of the channels
and were going to dry up the marsh
as I had suggested (But. 217).

June 20 Sunday.

Was called at 5:30 this morning
and left at 6:15 in a living rig for the
mouth of the Weber River. Could not get the
horse this time sent me to cross the
viaduct so had to come back and
get another.

The river when I crossed at
Ogden was high and contained more
water than when I came out a month

ago. Irrigation ditches were full
all along the road, and I saw
many small shallow ponds of
standing water. The country appeared
at its best now. The morning
was cool and pleasant so I
had an enjoyable ride.

A meadow with broad
thick leaves was in bloom all
along. I searched for the butts
Schrappes but did not find any.
Wildflowers were very abundant
through this country as were
Brewer's Blackbirds.

Reached W. D. Belnap's place
at 8:00 and about nine we
went below to the mouth of the
Weber. The water is high here, higher
now than it was last fall when
I was here last. During the past
spring I was told that a north
westerly wind had blown the salt water
in across the flats and I saw
where it had reached to a mile
east of the North shore gun club house.
Drift was laid up in the salt grass
and the grass stems were bent over
by the heavy water.

Last year there were some large
clumps of *Scirpus* across from the
club house and below it toward
the lake front. This spring nearly all
of this growth is dead, killed by

the advance of the salt water in
the lake. Only I near the borders of
the swiftly flowing channels had the
plants been able to live. Here the
constant supply of fresh water was
sufficient to counteract the salt.
~~It is~~ It is so easily seen from
observing this channel that the
lake is coming up rapidly now.
~~Though~~ The lake now is only half
a mile out from the club house
now.

Great Barrens show
incrustations of salt and alkali
glazing white in the sun. Shallow
pools, broad narrow ones bordered
by dead *Scirpus* are filled with
yellowish appearing ~~and~~ somewhat
saline water. Wrecks of intensely black
mud loose and giving off an
intense odor HS are common.
Even though water is high conditions
in general appear rather bad.

As yet there are few ducks in
here. Large numbers breed in the
upland pastures, alfalfa fields and
elsewhere along the irrigation ditches
in the higher land above. As the
young mature and work down stream
and congregated on these flats to
molt and spend the late
summer. There is little hope for
them that it could ever be better.

Water lower somewhat, and the
heat concentrates alkalis and salts
in its pools.

I was surprised to find
evidence of sick birds. Three
helpless pintails were noted. One
male ~~in~~ in eclipse plumage
was captured. as it flapped away
across the water ahead of me
its head swung from side to
side drunkenly. In capturing it
I found that the eyes were
protrudent, one the early symptoms
followed by the thick discharge
from the eye.

The following birds were noted
they were freshly shot.

Pintail (young)	2
(adult)	2

Mallard	1
---------	---

Stilt	1
-------	---

Widgeon	1
---------	---

It is difficult to get
through these channels now as the
water is high and the mud soft.
Near the center of the flats
we found a deposit of clay
and a sort of limestone like
shale that is unquestionably
washed in by the lake. This
material was found near an
old hole that had been dug
for a blind. I thought probably

that it had been thrown out
in making his excavation and
Belnap said that he had never
found such a deposit in digging
holes for signs of and
insisted that it had been washed
in from the lake.

Later we examined an
extensive deposit of similar
material at a point two
miles back from the lake shore.
This was throwing up as a
high bank 6 to 8 feet high
and extended with an
abrupt face for some half a mile.
The material in the main
was fine but in places fragments
half an inch to an inch across
were common. This appeared
to be a sort of shale. Back of
this deposit for 50 yards was
another ~~lower~~ ^{solidly} higher.
This deposit was a plainly
marked as the bench lines
along the mountains marking
the old lake shore and is
found in the same way.

I have been instructed to
secure some birds for mounting
for a dry farming congress exhibit
in Denver. Today I secured 3
Brewer's Blackbirds, 1 meadowlark,
and 3 English Sparrows for these purposes.

Reached Lyden at 7 and after reading a short time and doing some writing went to bed.

Alkali and Salt ^{Salt Lake City}
 Chief Causes for ^{Herbert - Republican} 4/10/15
 Utah Duck Malady

The report of Alex Wetmore, assistant biologist of the United States geological survey, who is conducting an investigation to determine causes for the duck malady in Utah, attributes the probable causes to salt, alkali and waste draining on marshes from beet sugar pulp. The report was completed yesterday by Mr. Wetmore and follows an investigation conducted by him on the eastern shore of the Great Salt lake for more than a year.

June 21, Monday

June 21, Monday
This morning I made several
purchases in Ogden and then
left for Corvallis at 9:20. Cherries are
now in full season and were being
sold at 10¢ per bushel.

Left Coeur about 11:30 and
came on down to Duckville without
incident.

put in the afternoon in caring
for a number of birds secured yesterday
at the north of the Weber. On the
English Sparrows, Brewers Blackbirds
and a few others were collected
to be mounted as day game
shot in Dubois.

June 22, Tuesday.
Water Gauge 7 A.M. June 19, 2 ft 1 1/2 inches
" 20 2 ft 3 1/2 "
" 21 2 ft 5 1/2 "
" 22 2 ft 8 "

The drop in the water level of the river June 18 has amounted to seven inches at the mouth of the river a surprising amount. And a matter ~~causing~~ changing conditions upon the flats greatly. Yesterday at Corinne the water had dropped about two feet and a half. Apparently with the warm weather that began June 16 the water in the river was entirely diverted into the irrigation canals leaving only suffrage to continue the course of the river. In coming down flood Corinne the difference was noticeable. Water is sharply lower now than it was at any time last year. The mouth of Woods Creek was entirely dry. This morning I went down to look at the traps on No. 3. Found nothing in them though birds had gone in and out of one of them. Water was low here and the flats were laid bare as they were during the lowest water last year. Ducks were abundant. I shot three Pintails and spent the afternoon dissecting them.

June 23 Wednesday

Water gauge at 7 A.M. 2 ft. 10 inches

This morning I went up the river in the little launch to Brown's overflow. Because of the rapid drop in the river the water was run from North Bay back into the river through this overflow and Kunder's and R. An all as considerably strong was being reported. Walked out along the bank of the overflow but could see of no sign of birds down. The whole east end of the bay was almost dry. The water was slightly calmer a few feet below Kunder's but most of them have gone somewhere else. We later managed to get within ~~within~~ a quarter of a mile of our search stopping place in the launch.

Went up along the river and shot a murrelet by sent in and mounted. Secured a small Plover domesticus & Kunder's. I looked for bats here but could see no trace of them when they were abundant last year.

Found a bogged down heifer calf in the north bank at Kunder's and dug it out. Spent the afternoon in dissecting this animal.

July 24, Thursday.

Water gauge at 7 a.m. 2 ft. 11 $\frac{3}{4}$ in.
Clear and warm all day.

This morning we towed a Rowboat
to Brown's Overflow and went out
into North Bay. There is still a
very slight current setting into
the river.

There was enough water
at the mouth of the Overflow to
attract much sowing not
difficult - I found a firm
sandy bottom at the mouth
of the Overflow with no
sand in the immediate course
of the stream itself. Great
beds of moss are exposed here
now left by the receding water.
There is very little water
now remaining in the eastern
end of the bay.

In the river in front of
the Bear River Club we captured
a sick Mallard male that
was unable to swim. He was
fat and in good condition.
There is absolutely no reason
to doubt that he would
recover entirely in the river.

In the afternoon Mr. Harry Finch,
Mr. Dick Rogers, Mr. Malcolm Kizer,
Mr. Hush and Mr. James Knigleson
came down to clean out
No. 4 with dynamite.

They were all over at the laboratory in the evening for an hour or two discussing various matters. Not much that was new was brought out however.

June 25 Friday.

This morning I went down to Sackett and watched them blowing out the channel of No. 4 for a while. They were placing the sticks ~~to~~ of dynamite too far apart and results were not very good. I tried to get some pictures but am doubtful of results. One male Cinnamon Teal flew over a shot just as it went off and the shot barely missed it.

No water was running out No. 4 into North Bay at all and for a part of the distance its channel was entirely dry. Lake No. 4 contained no water whatever and beyond Mullan Point was the first water in North Bay.

The water gauge this morning at 7 registered 3 ft and $\frac{1}{2}$ inch.

I went down $3\frac{1}{2}$ as far as the Ruby canal and found a fair flow of water out $3\frac{1}{2}$ though some little was going out the canal.

The party left this afternoon.

June 26, Saturday.

Wade gauge 7 a.m. 3 ft $1\frac{1}{4}$ inches.

This morning we towed a rowboat down $3\frac{1}{2}$ to Nelly's canal and then went down the old river bed. Hot and clear all day. Great growths of *Potamogeton* were present in the old channel almost closing it in places. Floating on the surface were masses of yellowish alga that clogged the progress of the boat. Today we went down much farther than on other occasions. In one place was the remains of an old flat boat made from 4 inch planks. The shores of the channel were lined with occasional clumps of tules or cattails. Back of these was a growth of salt grass shading off into *Sarcocornia* and then great stretches of open barren white with salt and alkali. Small rivulets from the main channels had growths of *Scirpus* bordering them. The channel was quite uniformly knee deep or more. A small stream from North Bay runs a fair stream of water. At its mouth is a sharp hole only a few feet across with very steep sides it could not touch bottom here with an oar. Four main channels lead off from the old river bed in various directions.

The water here was clear and fresh with no silt.

Ducks were very abundant along here. Most of them were Pintails with numbers of Mallards and a few Green-winged and Blue-winged J. Also where these birds had been resting were covered with their droppings. In passing these places I got a strong odor from it several times. Most of this excrement was firm and hard but in a few instances I noted that it was loose and greenish or white in color.

At one place it found rather an old time overflow had left the main channel and filled the broad lake. The exact course of the overflow was well marked in the sand - about forty feet from the channel we dug a hole.

Sand	12 in.
Sandy clay	7.
Sand	1 in.
Blue clay	10
Black clay	6
Sandy clay	10
finely black clay.	

The third layer, a inch of sand contained many shells. The first had bits of bulrush etc buried in it. The

soil in the bottom was black but had the same structure as all the ~~old~~ deposit that I call the old lake bottom. The different layers marked here were quite well

70 yards southwest of this hole
 at about the center of the old
 lake I put down another hole.

hard clay	7
Sandy clay	14
Sand & clay in alternation	10
blest clay	5
blue clay.	

alkali crust

The third layer of sand
 & clay alternating contained
 many shells.

it had by these holes
 in hopes of finding some bird
 bones but was disappointed.

June 27. Sunday.

Water gauge at 7 a.m. 2 ft 2 1/4 inches. It was clear today but cool. Last night was quite cold, a welcome change from the heat of the past few days. A strong north east wind blew during the forenoon keeping the mosquitoes down some what. In the afternoon they were very bad. These flies seem to swarm in the salt grasses and I keep out of growths of that plant whenever possible. Fox tail or *Salicornia* growing under exactly the same conditions as regards nearness to water etc. harbor very few.

In the forenoon I worked on a dissection of a male Ruddy shot yesterday.

In the afternoon I collected some insects and did some reaping on poisons. A few grey willows are still in bloom. White clover *Trifolium alba* is now in full bloom. Great numbers of *Apis mellifica* (italians) were gathering honey in the blossoms. I found a few plants of the yellow flowered species *M. officinalis* and a few plants of *M. affinis*. White clover and Red clover were both in bloom. Big bumble bees were seen on the red clover and

was found in sweet clover.

I collected two pairs of a peculiar moth that superficially ~~seems~~ resembles Polistes alpey. They were in copulation resting end to end.

Since the river has gone down ~~the~~ mud shows of greater or less breadth are visible all along. ~~The~~ When the water was high the roots of the vegetation were covered and the carp fed on them under water. Now they are forced to the surface and I hear the great sucking noises noticed last year as the fish protrude the heads and feed at the surface.

There was a very slight current setting out No. 1 today and the water in the river fairly flows. It seems clear and fresh however.

June 28, Monday
This morning at 7 the water gauge
registered 2 ft 2 ³/₄ inches. I heard it
at barely perceptible current in the
river today. Quite cool this
morning with the sky somewhat
overcast, threatening rain. This soon
cleared away however leaving the
day bright. I left at 10 AM.

After breakfast I went down
Channel 1 in a row boat. Lake No. 1
was entirely dry ~~the~~ no water
showing in it anywhere. A short
distance below and the water in
the overflow became shallow
so that I left the bank and went
on foot. Pintail nest was
dry save for a small space
near the center. No. 2 had a
small amount of water in it.
Lake No. 2 was entirely dry.
Nothing but mud showed as far
as mud point. Lake No. 3
I could see water but not
much. ~~the~~ small amount
of water showed in the east
side of east pass. The mud
across this great area was
still soft and made travel
hard. Great masses of Potamogeton
littered lay exposed in the
sun in some low places.
The surface of the mud was

moist and still fresh giving
no touch of salt. One or two
small pools that it came back
the water distinctly alkaline.

There were a few ducks and
quail eggs scattered about through-
out but most of the birds had
gone. Crows and starlings around
charcoal pile.

With the water as low as
it is, a southerly wind
would bring the water
far up the levee. Perhaps this
year have been the case on some
previous dry year when they
began to come up and started all
the trouble.

I walked back along No. 2 on
returning but noted little of
interest save that water was
low. The ducks were attracted by
the small amount of water in
the low end of No. 2 and I shot
four. One mallard male had merely
the tip of a wing broken and
a slight wound in the abdomen so
that I caught him and kept
him.

Spent the afternoon in dissections.
Had Bosley work on the platform
for experimental pens. Built a
shelf for my wash stand and
repaired the gate leading to my lab.

June 29, Tuesday,

Water gauge at 7:00 A.M. 3 feet 3 inches
Temperature 60°

The sky was overcast until noon
with a few sprinkles of rain.
In the afternoon it was clear and
very hot.

I spent the forenoon in South
Bay. Went out 3½ with the
launch and found a good
stream of running water greatly
to my relief. Since seeing Pintail
Nest yesterday, I have felt
rather doubtful as to whether
any birds would remain in the
country this year or not.

~~Here~~ 3½ seems to be the
main channel of the river now
but I found that considerably
water was running out the
right hand fork of 3. The flats
very dry from about S. August
Island across to Lady's Island.
Two channels ran down
that way giving passage for
rowboats and ~~there~~ was
some water on the flats
between Mud and Biglow's
Points. Below however everything
was dry save for the channels.
Thousands of ducks were
gathered on the flats below
with large numbers of Pelicans

Coots and a few gulls.
The ducks were mainly Pintails
with a great many Mallards
and a few Cinnamon Teal among
them. Practically all are drakes.

I walked along a long
distance at the edge of the
overflow in fact until I came
to water. The soil was firm
in most places though in a few
it was very muddy.

One pelican was found unable
to fly in the overflow and was
captured. Another was picked up
along on the flats. Besides these
two I captured a female
Redhead. She later was lying
on the bank as I came along
and went into the water. She
was captured after a long chase.
She brood was thin and seemed
rather weak. Am not certain that
it has the duck malady.

I hear that the Bear River people
have so second lot of water coming
into North Bay through their
canal now. Also have learned
that the power company whose
place is located below the dam
above have asked for more water
so that will help the river a
little. Apparently all the
river water has been taken off.

June 30, Wednesday.
 Watch guage at 7.9. M. 3 ft. Sin.
 This morning I worked practically
 all day in getting out my
 expense account and trip report for
 June. The amount was 233.78
 Expense for June stands as
 follows

Form 4	233.78
Booby Salary Form 3	50.00
Chemicals & Chas Johnson Form 5	6.05
Lumber - Shaw Form 5	95.35
Trans requests	<u>1.70</u>
Total.	386.88

Expense for May	224.54
" " June	386.88

released in letter of authorization June 18	<u>100.00</u>
	711.42

amount of authorization	750.00
expended	<u>711.42</u>
balance	38.58

It was not all play just
 in the laboratory. I found it
 very comfortable. The light is
 very strong now. In the evening
 I spent some time in writing notes
 and official letters.

July 1, Thursday.
Watts garage at 7:00 a.m.
3 put 3 wheels +.

About 8 I left for Corina
with Poplar. On this trip today
I burned 1 government gasoline
and used my own engine
so paid no boat hire.

The water in the river
now has very little silt in
it and is green in color. So
the taste it is slightly saline.
This was a matter of surprise
to me.

Not as many birds were
seen along the stream as usual
probably not more than $\frac{1}{2}$ of the
number of ducks that
I noted in May. Several broods
of young mallard and cinnamon teal
were noted.

Great bars were visible all
along and in several places
the channel was very narrow.
At Corina the top of the wharf
was covered with myriads
of large dead carp were seen floating
on the surface. All were dead
and I do not know what killed
them.

Received mail in Corina.
The voucher for my May expense
has not yet arrived.

Talked for a few minutes with
the man in charge of the
water for the sugar company.
He said that up above Conine
at the dam the large ditch
on the north side takes 55 second
ft of water in a smaller ditch
on the south bank it gave 80 to
110 ft. At present the entire
stream save for a small amount
allowed to pass for the use of the
power station at Whelan is taken
out. At that they have only
470 second ft. The ditch
loses considerable by seepage when
it first comes out. It had
been reported that last Friday
~~evening~~ had additional water
had been turned into the river
from Bear Lake by the power
company. The gauge at the dam
had as yet indicated no rise.
The power house at Whelan
was running only one machine
whether they would continue or not he
did not know. If they shut down
the rest of the water would be
turned into the canal. The sugar
buds require a great deal of
water and thus I would be no
let up in the demand until
September 1. In other words there
was no more chance of water

below. On fact the river will
probably go somewhat lower.

I left Corning at 2:15 P.M.
and stopped for an hour or more
in a willow grove ~~at~~ a half
mile down stream. The willows
were 25 to 30 feet tall and 10 to 12
inches through. There was an
undergrowth of wild currant
and wild rose. I found several
good sized trees of *Crataegus*.

Boatmen on the river there was
a series of ponds the water
of which was rather low and
actually saline. These extended
for more than a mile.

Shot two great Blue Herons
and a Night Heron in returning.
Reached Butte about 7.

July 2, Friday.

Today I put in carrying for
the birds secured yesterday and
in reading on methods in securing
Had Bosley skin the larger birds.
Graham Davenport from the Bear River
Club went in to Corning today and
I wrote several letters to send in
with him. A. M. McDonald came
down from Davis Ranch and
brought me a bushel of barley.
Water gauge 3 ft 3 $\frac{1}{4}$ inches.

In the evening I went up to
Davis place and met Mr. McDonald.

He is a big man, a soft spoken
settler with an enormous chest.
He says that in a week or ten days
that he will have with him half the
stream of the Malad River into North
Bay through the canal. This will
probably lower the level of the
Bear River somewhat at the
Club as the Malad is its main
source of water at present. The
Malad is described as a swift
stream carrying much sediment;
a stream that very crooked
forming S shaped bends & throughs
its course. The canal mentioned is
an old canal formerly carrying water
to a mill in Corinne.

A Salt Creek (so named) runs
a considerable stream of water
into the Bear above Corinne and
it is this that gives the stream
its salinity at present. Under
ordinary circumstances this is
lost in the great volume of fresh
water coming down.

That irrigation affects this
stream enormously, no one can
doubt who sees it now.

On coming along the
river I collected a young
Tyrannus tyrannus 4 or 5 days and
a Red wing somewhat older and
put them up in formalin. These
birds when placed on the table

lay prostrate on the breast with
neck outstretched and wings extended.
Any moving motion was accidental
and I could detect a tendency
toward alternation in movement
in the limbs as in a lizard. All
attempts at progress however were
so uncertain that this was
rather indefinite.

The young Redwing thought it had
no wing claw had a curious
development that would aid in
a four limbed progression through
grass and mud. The tip of
the bone of the pollex though covered
by skin projected noticeably as
a protuberant somewhat jointed knob
that would serve all the
functions of a wing claw.
Clear land way last today.

July 3, Saturday.

This went went 3 1/2 and
out on the flats with a row boat.
Water gauge at 7:00 A.M. 3 ft. 3 1/4 inches.
There was much more water
on the flats here than I had
anticipated and by keeping in
the center of the bay at found it
fairly deep and easy travelling.
I think that on my previous visit
here that the water had gone down so
rapidly that the moss was left
standing above the surface. This save

the impression from a distance
of great areas of bare mud.
In reality, there was much
water and, as the ponds
have settled down this has
become evident.

There were ~~some~~ large numbers
of carp down in the pond.
Still others were gathered in
the overflows. On passing down
I heard the hollow sound ~~of~~
that they make in striking
against other carp or some
solid object in crowding away
from the boat. These fish destroy
great quantities of plant food but
float out the Potamogeton so
that quantities float away with the
current.

Ducks were gathered in great
numbers far down on the flats,
being abundant as far as Sloughs,
Island and most of them were Pintails
but a great many Common Teal
are in here now and a fair number
of Spermills. Many body feathers are
floating on the water now and
I saw half a dozen remiges in
one place.

One sick mallard was
picked up a young bird though
fully grown. A dead California gull
was seen.
In the evening it clouded up

and we had a few minutes
of rain. Immediately the alkali
& salt incrustation on the flats
disappeared and little tiny pools
were formed. The flats changed
from pure white to the dull
brown of the mud beneath.

Swallows appeared tonight
gathering in for their night summer
roosts. Perhaps twenty Bank
Swallows and a dozen or two
Cliff Swallows were seen.

July 4, Sunday.

Water gauge at 7:00 A.M. 3 ft 3 in.
The rain last night raised the
water $\frac{1}{4}$ inch. As the flats
dried this morning the saline
encrustations gradually crystallized
again, until by noon they were
white as ever.

This afternoon I banded some
young Redwings, Kingbirds and
Barn Swallows.

Talked for some time with
Angie M. Donald at the Bear River Club.
He could not remember how long it
had been since the old river channel
was closed.

July 5 Monday.

This morning we went up the river in the launch to Brown's Overflow towing a rowboat.

Water gauge at 7:00 A.M. 3 ft. $2\frac{5}{8}$ inches. The rain above here has raised the river and the stream was carrying more silt this morning than it has for several days.

I found Brown's Overflow of low so that the launch could proceed only 100 yards from its mouth. Went on foot into the Bay in the rowboat.

There were two broods of young Gadwall in here, one of Pintails and one of Redheads.

I found one Pintail that had died recently lying on the shore and noted a dead Magpie. Out in the Bay I picked up ~~one~~ ^{two} dead sick King Billed and a California gull. Notes on these follow.

There is a small amount of water in the center of the bay but enormous areas are entirely dry. A very slight current set out of Brown's Overflow. The whole western end is almost entirely dry and the water is very much restricted.

On the slough the California Gull were small amounts of the beds of *Potamogeton pectinatus*.

And these seeds are found almost invariably in the stomachs of sick birds (not noted in Egretta or Pelecanus). These cast up on the shore lim tend to become coated with salt. Picked up and eaten they might cause trouble. This can be readily tried out in any experiment.

Spent the afternoon in working mainly on the Calif Gull. Prepared three blood slides, fixing in Werners fluid, staining in Eosin, washing in 50, 70, 80, 95, absolute alcohol and xylol and mounting in balsam. Blood was taken from wing.

July 6, Tuesday.

Walden group at 7:00 A.M. 3 ft. 2 $\frac{3}{8}$ in.
It rained up in the canyon
above yesterday afternoon. This
morning it was quite cool
here.

This morning I completed
dissections etc on the hills on
which I was working yesterday.
And Bosley repaired both old
pens and I put new latches on
them. The birds seem to
be doing well in the large pen
set in the river in July. I
had the bottom covered with
lunch mesh wire to prevent
digging out. They did not jump
very well at first but now
do not seem to mind it.

The salinity of the river has
been a cause of worry to me
but apparently it does not
trouble the ducks.

A mallard, immature though
full grown that was secured
when sick July 3 could not
stand nor swim. Its recovery
has been very rapid. When brought
in the eyes were closed and
morning. This had almost
disappeared on the following day.
Yesterday the bird was quite
active. Today the bird swims
and walks though when in the

water the wings droop slightly.

The salt grass flats in front of the laboratory turned brown ~~for~~ because of the ripening of the seed heads ten days ago. Already there are signs of fall about.

Quite a number of Bank and Cliff swallows came in to roost tonight. There is a small flight of Shorebirds in. Lesser yellowlegs are seen nearly every day and the Western Sandpipers have come.

Warblers were shedding the fluffy cover from their nest heads when I came down the river May 19 and a few are still doing. The same species of plants seem to mature irregularly here. I note the earlier start in the breeding of the birds. Perhaps the frequent cold spells of the spring season retard the development of physiological activity.

July 17, Wednesday.

Quite cold last night. Thermometer this morning at about 60° with a north west wind. Water gauge at 7:00 A.M. 3 ft. $1\frac{1}{2}$ inches. at 3:00 P.M. 3 ft 0 inches. I do not know what to attribute this rise unless the rain in the mountains was very

heavy and the water has just
reached here.

After breakfast Bosley and I
rowed down No. 1. The channel
was almost devoid of bird life
very few ducks seen. Two birds
of young cinnamon teal were seen.
The channel was low and
stagnant. No water ran onto the
flats at all. From the river on down
masses of alkali flies (*Ephydra*)
were gathered on the drying
surface of the exposed mud at
the water's edge. As ~~the~~ boat
passed they rose in swarms
over the waves washing up
on the shore.

Great numbers of clams of two
species have died here in the
unflow. Many have been left high
and dry but others have
died while under water.
Dead ones have been fly blown
and are filled with maggots.

Two dead crayfish. *Cambarus*
you found in the water.
Bosley picked up two yesterday.

At the mouth of No. 1
are great areas of Foxtail grass
fully matured and covered
flats that last year were
under water and bare. The
growth is large and erect.
The grass grows in clumps

with spaces between. The
Barnswallow sparrows and yellowbilled
blackbirds delight to run about
in these passageways to feed.
The ground beneath is perfectly
bare.

In the center of Pintail Neck
was a small shallow
pool of water. Elsewhere in East
Pass and over to Mud Point
the flats were dry. We crossed
on foot and opposite Bayless
Island found a small area
of mud where we sank to our
ankles but elsewhere the ground
was dry or merely moist. This
moist condition prevailed through
the upper half of East Pass.
Below and as far as the
rail trail the ground was
baked hard and was cracked
in places for an inch. The
ground was broken into blocks
from four or five inches to a
foot or 15 inches square. Each
block had the border warped
up slightly in drying. The surface
was slightly raised to the
last.

The course of the narrow
crooked rat trail was dry
and opening into it depressions
filled with damp mud
were found. Lower down still

from roots from an inch or
two to three feet deep and
ten to thirty feet long. The water
in there was absolutely salt
a strong solution.

Along here the *Scirpus* growth
showed green near the border
of the channel but back it was
entirely dead after nearly a
mile this gave way to growth
that had been dead for a
year or two and this thing
but was replaced by an
open level flat where the
rootlets had been washed
out of the soil and gathering
in great masses by the
tough fibrous runners had been
heaped up in neat little
mounds containing from one to
two or three feet ~~apart~~ bushes
or more. These were distributed
over the flats at spaces of
from 100 to 400 or 500 feet. The
surface here was covered with
a whitish encrustation of salt
about $\frac{1}{16}$ of an inch thick. Each
foot mark I showed water in the
soil beneath. The soil was moist
but firm. I walked out a
mile and a quarter at least
trying to reach the water of
the Willard spring but could
not find it and finally turned back

A mirage of water hung
in front of me half a mile
away I all the way out but
by watching the little piles
of Scirpus bulbs projecting
I finally decided that what
was a long ways out.

As Marsh Wrens were common
all down East Pass and many
had their second broods with
young a week old in the cattails
These birds were common too
in the Scirpus growth on
Klondike about the salt pools
What they do for water I
cannot imagine.

One or two small Cinnamon
Teal that evidently had nests
were flushed along the salt trail
and two deserted nests of
the Redhead and several Coot
nests were found.

In the vanishing dead
growth of Scirpus about the
Plover I still resting. I saw
me flock of a dozen Western
Sandpipers here and a
few Snowy Plover were noted.
How they can exist here without
water is a constant cause
wonder to me. Food is abundant.
Killdeer, Curlews, Belding's etc.
were common. Cicadulids of
two species were found & a

Spiders was common. The
head growths of Sciphus seen
this were abundant. One bit me
on the forearm & caused a painful
swelling for an minute. When
these insects were most abundant
the ground beneath the Sciphus
was permeated in salt.

In one pool of extremely salty
water I saw a single Corixid
swimming about.

I saw about a half & a Western
Landpiper were shot. In
dissection no trace of intestinal
trouble was found.

In searching Marsh Wrens
nests three adult & one
young *Pirithodonta* were found
in separate nests $2\frac{1}{2}$ to 3 feet
from the ground. One was found
a couple of days ago so that
this seems to be common habit.

Meekrat tracks in the hard
ground was abundant all down East
Pass and in places where the
ground was ~~fresh~~ soft they were
fairly fresh.

July 8, Thursday.

We started gauge at 7:00 A.M. 2 ft. 8 $\frac{1}{4}$ inches
There has been a raise of 7 inches
since the fourth.

It was hot and clear all
day today.

In the forenoon took the launch
and went out 3 $\frac{1}{2}$ and then down
as far as Bigelow's point in the
rowboat.

The current in the river today
is quite swift ~~of~~ a change
from the slow movement of
the last ten days. The water too
contains more silt though still
far below normal in that respect.
A current of was was setting
out No. 4 at 8 o'clocks through the
new channel.

The current in 3 $\frac{1}{2}$ was strong
and the raise in water has again
covered the flats here. I went far
down in the launch beyond where
I have been before. Many birds had
gathered in to feed here on the
flooded areas. Ducks, Pintails,
Cinnamon Teal, Green-winged Teal,
Pied-billed Grebe, etc. There were
a good many Willet, Coot and
Mourning Doves.

One sick Avocet was noted
that could barely fly and a
sick Willet sitting down could
barely fly.

Great numbers of the alkali birds
were gathered here at the border of
the overflow. They have been driven
in here from the flats by the rise in
water and now their true numbers
may be appreciated.

A sick California Gull was
picked up on the flats. It could
stand with some difficulty but
could not fly. Another near it rose
with difficulty. The captured
bird was clean and seemed
alert. The eyes however were
~~protruding~~ ~~apparently~~ ~~forced out~~
by swelling in the ~~Maxillary~~
glands. It was quite vicious
and struck at me repeatedly.

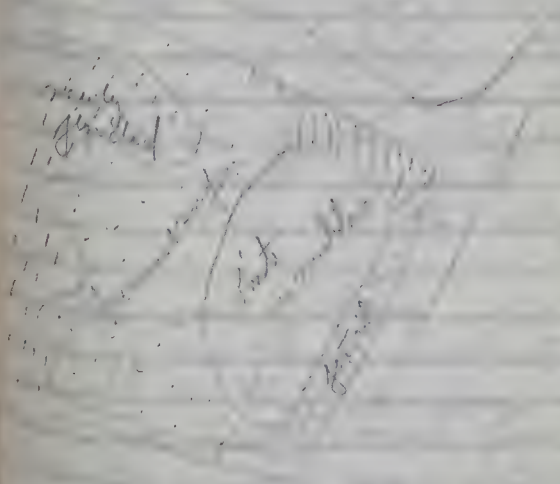
A sick Pelican was seen
in the overflow also.

I could detect no difference
between the water on the flats
when they were newly flooded and
that in the overflow by taste.

Returning I crossed into
No. 3 and went out the small
overflow where I have come so
often. The flats here were largely
flooded also. As the water came
up it ran back through the
cracks seaming the soil and
~~then~~ seeped through the ground.
So that a damp area from
me to six feet wide preceded
the actual flooding of the ground

At the edge of the incoming water was a scum of bubbles. The water in the cracks between the squares of dirt was strongly saline to the taste.

Here on this flat was an area white with salt and alkali and surrounding it another area with a hard brownish surface. The water was flooding the latter. The accompanying diagram shows the relation of the two.



When the surface was crumpled ~~some~~ blocks 3 inches thick could be lifted up whole. Some of these I brought back for examination in the laboratory.

After dinner I took the launch and went out Brown's Conflow to see how the water

Conditions even there. I found the ~~water~~ water in the flow high with a good current. The spread of water over the flats has been less as yet here than on South Bay. These three first flows about $\frac{1}{4}$ or less of the water supply of the river and so rise in them would be more gradual.

To the east of Browns the water had spread over an area covered with dried moss but to the west had come in very little as yet. Water had seeped in through deep cracks and was standing 30 or 40 feet back of the pools. There was a very small amount of brackish water here at the edge of the pools.

In some places a hardening scale of surface incrustation had raised to the surface as the water came in and was floating. A sample of this was taken.

One sick California Gull was the only sick bird found & brought in. The Gulls eat the entrails of sick birds and it is of course within the possibilities that they become affected from this.

There was a gachwall and a Peahack in New each with

A brood of young. These birds simulate the behavior of the real birds exactly except that they do not try to dive.

A dead muskrat still fresh was seen on the bank of the overflow. It was an adult. And adult female was shot.

A grass snake was seen swimming across the channel. As I came near it stopped and watched me and then went on.

Small Bembidie were seen to run out on the water struggle for an instant and then take flight.

A magpie with the trouble was caught alive. Notes on it follow.

July 9, Friday.

Cool this morning with
sky heavily overcast. It rained
for half an hour or more
quite hard a cold downpour.
Water gauge at 7:00 A. M. 2 ft. $7\frac{3}{4}$
inches.

Went out ~~the~~ $3\frac{1}{2}$ for
three hours after breakfast.

The water level here on the
flats was high giving a
flooding of good fresh
water. As this whole
supply of ~~fresh~~ water is so
fresh I do not look for
trouble here among the birds.
Had the water raised largely
through that standing on the
flats results might have been
different.

Numbers of Cinnamon Teal were
feeding in the newly flooded
areas. One that I shot
was somewhat affected.

Put in the afternoon in
working with two live gulls
secured yesterday.
Sunset off clear and
hot in the afternoon.

July 10, Saturday.

This morning the water gauge at 7:00 a.m. stood at 2 ft. $9\frac{1}{2}$ inches.

The sky was overcast for most of the day and it was fairly cool.

I sent Bosby out Brown's overflow in the launch. He came back about 11 with two sick Mallards both immature birds. These were found at the mouth of the overflow. From his report I judged that the water had risen somewhat in the flate.

I put in part of the morning in working with the two California gulls that I am trying to cure. So I left quite a bit of writing.

The river has raised until the large pen containing the ducks is flooded. This morning we took the ducks out and moved the pen a few yards up stream. The whole thing is a small bar. When properly placed the pen should be $\frac{2}{3}$ in the water leaving $\frac{1}{3}$ of the floor space as a resting spot for the birds. There were four pens ten inches long in the pen and it is hard to see how they got in. In feeding one of them went over all the slats on side of the pen.

against the sides in the bottom.
The other showed more or less
of this. The large carp outside
must have moved the bottom
somewhat to get at the wheat
& barley fed to the ducks.
Line 8. The carp caught had
the scales entirely covered with
scabs: the other had etc.
Containing small number with
no swimming weed on them
etc.

The two mallards in the
pen were fed the chate especially
so. Both are now strong and
vigorous.

The young gadwags appearing
to be doing well they are not
at all backward about driving
the mallards from the pond if
their rights are being encroached
upon.

As the afternoon we put up
two pens of inch mesh wire
with 3 feet high, 3 feet wide, and
six feet long. These are to stand
upon platforms made of
matched planks & grooved flooring
raised 1 foot from the ground.
A circular hole in the center
of the base at one end contains
a dish pan with water.
This improved type of pen
obviates all danger of any

foreign element coming in from
the soil and give almost
absolute control of it. The conditions
under which experiments may
be carried on.

The cost of each pen and
base is as follows.

72 sq. ft. 1 in mesh chicken wire @ $\$4^00$ per lb.	.72
53 feet 2X4 - $35\frac{1}{3}$ bd ft. @ 29^00	1.02
41 " 1X4 - $15\frac{1}{3}$ " " " "	.40
105 " 1X4 flooring 55 " " " @ 30^00	1.05
$\frac{1}{3}$ lb staples @ 110	.04
1 lb 8d cement nails	.05
1 lb. 16d nails common	.05
1 latch	.02
1 pr. 3 in strap hinges	.10
1 pan	.50
	<u>$\\$3.95$</u>

Probably fewer nails were used
than is estimated.

July 11, Sunday.

Water gauge at 7:00 a.m. 2 ft. 8 in.
Very hot all day today though
a slight breeze in the afternoon
kept the laboratory fairly comfortable.
After caring for the gulls in the
morning I went down channel
in a rowboat. Only two or
three ducks were seen in
the overflow and other birds
were scarce quite a contrast
to what I found last year
when there was abundance of
water. There is a moderate
amount of water in Lake 1
and 2 now and perhaps a
little less than one half of
Pintail neck is flooded. I could
see water to the down the
center of east pass. and
~~considerable~~ ponds of water in the
area covered the region toward
Mud Point.

A stringy scum was noted
at the surface of the water
on the channel but I could
not determine what it was.
No sick birds were seen.

In the afternoon I wrote
up some notes and a
good many letters.
Cared for the gulls twice today
and
worked steadily until 8
o'clock.

Brought a flock of Willet passed
over about 9:30 P.M. going south.
learned in the evening that
ducks were feeding last fall on
but pulp at the mouth of the
overflow.

July 12, Monday.

Water gauge 7:00 a.m. 24 8 1/4 in.
a light shower of heavy drops
work on at 5:00. Was a fair
~~and~~ ~~from~~ felt was very hot
all day though slightly cloudy
during the forenoon.

Noticed that there is a
very slight current in No. 1.
Mr. Perry temporarily watched
but the Bear River Club came in for
half an hour or so. He returns
to Perry today and let get him
to take out some mail.

The check brought in Saturday
are closing well.

Went down the river and out
Brown's overflow expecting to find a
few sick birds but did not see
any. The water has come in
a little more on either side
of the overflow at the mouth but
still above only the dried
moss. A large flock of Pintails
were around seal, 40 in number seal
were standing on the flats here
all were drabs. Several broods
of young Curlew were

seen in the flock that were
newly hatched. Two bands of young
goshawks were seen also. One of
young of the year was seen
to fly with the goshawks. It
climbed about at once the feet
of an older young goshawk. Both
Hank and I signalled in attendance.
As the launch passed the goshawk
flew and all the young followed
the lead up the bank. I was
puzzled at first to ~~catch~~ on
capturing both species from my
boat.

Spent considerably time with
the two sick gulls today.
Found a. Good many shore
birds willow, goshawk & Western
Sandpipers in the flats

July 13, Tuesday.

Water gauge at 7:00 a.m. 2 ft. 8 1/2 inches.
The river is slowly going down
again.

The gulls may become sick in
two ways. If this trouble is at
all contagious they may get infection
from eating the entrails and feces
of diseased ducks.

Or if they become infected first
hand from the water they may
get it while washing and drinking
in the shallows. I watched a
ring-bill yesterday in Brown's Couflow

lying in water an $1\frac{1}{2}$ or perhaps
2 inches deep on newly flooded
ground and washing and at
the same time drinking
considerable quantities of water.

One is at a great disadvantage
in working with disease among birds.
None of those affected are able to tell
what they have been doing, eating,
or drinking.

Worked in the laboratory
nearly all day getting at
the information contained in the
water analyses that have been
made last year. Magnesium Chloride
seems the most promising base
present.

Sent Bosby down $3\frac{1}{2}$. He
reported great numbers of ducks
in the flats but found no sick
birds. Brought in one young
Redhead that he had caught.

I packed in express box
of skins and one or two
smaller parcels.

It was exceedingly hot all
day. In the laboratory there
is usually a light breeze.
In the evening a strong
breeze from the southwest
and we had a strong wind
and some rain. There was
quite a flight of yellowlegs (flavipes) about
noon & endpapers show that

North at dusk. left swimming
in past the laboratory. This
seems to be a regular flight line
here

July 14, Wednesday.

Water gauge this morning 2 ft. 10 in.
The water is steadily dropping
left at 8 in Corinn. It was
much colder this morning
though clear and there was
a good breeze. It truly
felt like fall.

Frank Halsey told me that
the town raised because an
irrigation canal above had
broken. Now the water will
probably sink to its former level.
The willows below
Hunsucker now hundreds of
male Redwings very probably
gathered here for the molt. Very
few females were seen with them.

Reached Corinn about 11.
Got the mail and read it.
Received various supplies, 2
scratch pads, stomach labels
bottles etc. Had an express
box from Schramm Johnson.
I shipped an express box of
salted skins and two packages
by mail.

Purchased 45 pounds of wheat
and some 2x4 and 1x4 lumber
I need

Saw several muskrats
carrying grass today. Their
young must be well grown
by now.

Left Corinn at 3:00 & reached
Ruckville about 6:00.

Found that the gull that
I was caring for in the laboratory
was dead.

Unpacked mail & express
box and put the supplies
received where they belonged.

July 15, Thursday.

This morning the water gauge
registered 2 ft. 11 inches. The water is
dropping steadily. It was hot
and clear all day today.

Went up the river and out
Brown's overflow this morning. The
water in the overflow was quite
low and between the river
and north bay was almost an
exact balance. The ~~current~~ ^{current} thus
being slight current in the overflow.

At the mouth of the overflow
at the island yellowish brown
tinted water from the bay
filled the right hand shallow
channel. The deeper left hand
channel was still filled
with silt bearing water from
the river, greyish in color.
The water thus received
a great deal in the bay.

in either side.

Two young mallards were
picked up along the overflow
thylless. These young mallards that
I have secured here 5 in all
at present are all living well
from the same brood. I
saw them near at the mouth
of the shallow eight hundred
channel in Brooks some time
ago and believe that they
were raised here. All may have
secured infection at one time
but it may be that some have
proved more resistant than
others.

One freshly dead Cinnamon
Seal was seen.

A curious brownish stain
has appeared on the mud at
the bottom of the river and I
see the same thing on the flats
examined microscopically spindle
shaped bodies occur of minute
size giving the color. Ulter
material is associated with
them. This will be described
later.

My work here began a year
ago today. There is so much
that may be done here that I
seem to accomplish very little.

July 16, Friday.

Water gauge at 7:00 A.M. 3 ft. 1 1/2 inches.
The current in the river is very
slow again & the water is comparatively
free of sediment. No water goes out
(No 1.) at present and the current
is stagnant.

This morning I went out
into South Bay going down
channel 3 1/2. There was a full a
good current here and I was
able to get quite far down with the
launch and went down farther
in the row boat.

There were great areas of
soft mud here & almost bare
of water and in these were
swarms of Western Sandpipers, a
few Wilson Phalaropes and numbers
of Marbled godwits. I saw 250
of these latter birds, 27 on flock.
~~With~~ all these shore birds, and
flocks of Pelicans & other birds they
made a scene of great animation
and one that I felt was loath
to disturb.

A sick Cinnamon and
one Green-winged Teal were
captured both adult males in
 eclipse plumage. Not as many
ducks were seen here as
usual.

At a gun shot the shore birds
rose and circled the Western

sandpipers appearing like swarms
of bees. I collected six.
Gooset a long-billed curlew eight
Western Sandpipers and a few
Black Cormorants.

I found Graham Dewarport
at the Club. And spent an
hour talking with him.

I skinned several birds in the
afternoon. Had Booby put
finch mesh wire over the
bottom of the second large pen
and placed it in the water.
The mallards are too large
and heavy for the smaller
chicks and I do not wish
to lose any of the birds on hand
at present. I hope I will build
another large pen of finch mesh
wire and in it will keep the
birds that are entirely helpless
that it may be whether or not
I cannot raise my percentage
of recovery above what it was
last year. The condition of the
river is a problem. With
slight current birds may
recover at least this year
no trouble so far. It will do
no good to worry about it
at any rate.

July 17 Saturday

Water gauge this morning registered 3 ft 2 1/2 inches. The river is dropping entirely too fast to suit me. Clear and hot all day but with a moderate breeze that made the laboratory bearable.

Sent Bosby out Randam No. 1 this morning. He reported that the east end of the Bay was entirely dry and that the water in the overflow was very low.

Very few birds were seen. He brought in one sick mallard and a adult female. Gave the birds some Potamogeton brought in from South Bay this morning. Fred Mansfield went to haul a boat into Bingham today from the Duckworth Gun Club so I did not go. Fred was out here so this morning working with an official report.

Fred told me that formerly the old river channel was entirely dry. He came down from Corinne 26 years in a sail boat with Brown and cut a load of willows along the old channel. Willow growth was then abundant and Brown or Brown signs were seen. 4 years later the channel was closed and has been ever since. Though the level of the channel

was below that of North Bay
soil conditions were such that
there was no seepage to fill it.
Hansen dug a channel across
from North Bay and the old
river was thus filled with water
ever since.

Worked at the microscope
during most of the afternoon.
We hauled the little launch
out after dinner. It has been
leaking badly and needs repairs.

In the evening went in
swimming. The river water was
distinctly saline in taste.

After a bath my arms where
tanned show a whitish deposit
from the water, probably a
combination of silt & mineral.
Many swallows were about
this evening resting on the wires.
Ducks and coots have almost
disappeared from the river. The
season is fast past. This week
~~is perhaps~~ ^{is} in advance of
what it was last year. I

During the last few days since
July 14 I have noticed that
as the water slowly receded in the
river the mud beneath shallow
skins of water along the water's
edge took on a yellowish
brown appearance as though
some sediment had been deposited.
This was especially heavy in
small indentations and tiny pools
almost isolated from the main
body. This ~~after~~ appearance
was noted along the head of
channel 1 and was common
at the mouth of Brown's Conflow.
In my pens it was very
strong.

On microscopic examination
I find it due to elongate
spindle shaped bodies that
have a slight tendency toward
a sigmoid flexure. There are
more spots show in the center
of the body. These had a slight
yellowish tinge and were
sufficient in mass to give
the color noted. I found
them represented in sections taken
floating from the surface of channel
near outlet of lake 1 and
Brown's Conflow near the island.
They seem in mass to form
a film over the surface of the

mud that is coherent and
rises ~~when~~ ~~when~~ becoming loosed
rises and floats when again
muddied.

These spinulles were present
in enormous numbers. They
are I think an algal formation.

Some I fixed in Bouin's
Picro-formol but as they were
so small found difficulty in
handling them. I dried one
film on a slide and tried
washing it in alcohol but the
material refused to adhere.

Finally I partly dried a film,
placed a drop of absolute alcohol
on it let it evaporate then a
drop of xylol let this partly
evaporate and then mounted
in balsam.

July 18, Sunday.
Water gauge at 7:00 A.M. 3 ft. 3 in.
The current in the river is very
stagnant now.

Today it was hot and clear
all day long. The nights now
are cool and pleasant. The
thermometer in the mornings standing
at times at 60°.

During the early morning I
did various small jobs about
the laboratory and some writing.
About 10:30 I walked
up along the river as far as
the Bear River Club.

Small bird life is not common
here now. I noticed a few
Savanna Sparrows, two families
of yellowthroats and in some
bushes some Red winged
and yellow headed Blackbirds. One
or two pairs of Kingbirds were
seen.

The Foxtail grass has gone
to seed and my heavy boots
were filled with the long
hair like heads causing a disagreeable
itching. Some of the scrub down
has matured and is drying
up. All of the plants along
the river show the effect of
dry hot weather being
shrivelled and brown in places.
Compass plant has come up along

abundantly.

One or two small heads of
sunflower were filled with the
thrips of which specimens were
taken. I find it is in
blossom now.

I find frogs common in
the low grass.

On the alkali barrens in
several places ~~the~~ brown
earth was popped up through
alkali forming a raised &
puffy crust. firm but readily
crumbled into a fine dust.

The salt loving cheepods will
be able to hold it this winter
year I believe. I had supposed
they had been found in some way
during the last year with the
birds standing on the flats.
The first one I killed last night
was the first one that was killed
Notes as it follows.

I at in the afternoon in reaching
and when I left of down water then
last year at the Bear River Club
camp down with three other
gentlemen named Shon. Salt
from mainly along the
line of alkali disease.

July 19, Monday.

Water gauge this morning 3 ft. 3 1/2 in
clear and hot all day.

After breakfast walked off north
crossing the river ~~and~~ reaching
North Bay west of Kindall's Point.

In the eastern end of the
Bay is a small body of
water from which a long
narrow strip runs north of
the middle going west
toward Long Point. Elsewhere
the bay is dry. The water
was perhaps half a mile
from the edge of the marsh
where it comes normally.

Near the edge the ground was
dry but farther out the mud
was soft and walking hard.
Near the ridge a saline scale
was beginning to form. The
water in the Bay was
pale. Great quantities of
Potamogeton were lying drying
in the sun.

There were many naiads
in the water plants and
many Libellula, Enallagma, etc.
were gathered to feed on them.

The ducks have almost
forsaken this part of the bay.
The only dead bird seen was
a forster's duck and it was old
and dried. Several large carp

direct and usually partly
calm was noted. I
Point and round the whole
bay by across to Mallard
Point and beyond. No water
was coming into No 4 at all
though the new channel
continued standing water.

Lake No. 4 was entirely dry.
On Simpson Point in the
rushes were 15 or 20 Great Blue
Herons' nests. Very many young
not quite able to fly - about
about their small feet
before me some of them going
shuttles from but when they
ran before me sighed by their
flapping wings. I collected one.

On one nest was a
great mass of regurgitated
pellets consisting of feathers
and bird bones in the cream.
These I collected. This taste
for bird may have been a
peculiarity of this one pair. The
pellets were not present in the
other nests though I found
the remains of one quail.
Coots & Anodonta and shells were
the species identified in a
curious examination. One fresh
pellet examined was a bolus
6 by 3 inches and was soft

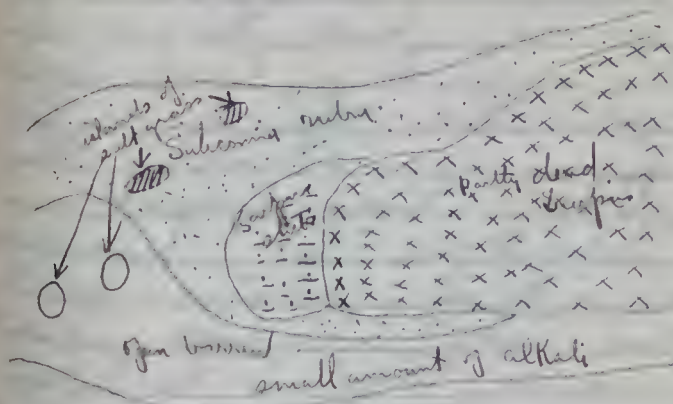
not being firmly packed as
we saw pellets. Old pellets
were all flattened out in thin
cakes by the trampling of the
birds feet.

On crossing the flats
between the river and North
Bay large areas where the
dirt had puffed up through the
alkali scale were seen. One area
old pool bed was a large area
of *Salicornia* most of which
was dead or dying. It had
received a good start but
the raising salts had been
too much for it.

On studying the conditions
here the plant succession on
these flats seems to be as follows.
Bordering the bays where the
water is deep are growths of
bulrush or *tule*. As the water
becomes shallow great expanses
of *Scyphus paludosus* follow these.
forming the typical marsh.
As the siltage increases and
and the marsh fills in this
becomes dry. And the higher
portions where the water
supply is not renewed constantly
salinity begins to raise in the
ground water impregnating the
soil aided by percolation when
the marsh is dry and the

Salts are raised by capillarity
during evaporation. Along the
border saline conditions become
too strong for the *Scripus* and
this growth dies. Small
growths of *Salicornia* with
a few *Leptochloa* and perhaps a
little *Kochia* appears usually
as rather sickly growths on
the *Scripus* may give way
to an alkali barren covered
with a white encrustation
and destitute of plant growth.
In case the salt loving
plants do follow the *Scripus*
conditions become too strong
for them also and they die
out giving way to the
barren. As the land lifts
in a little more *Onopordium*
the salines begin to leach out
of this barren until finally
Kochia vestita and *Salicornia*
rubra are able to take root again.
As this growth extends ~~extending~~
over possible chance to spread
the area first covered is
given over to salt grass
Histiobasis spicata

In the diagram here made
from an actual locality on the
flats north of the Duckville
gun club the dying out of



the growth of Scirpus paludosus
is illustrated. The great growth
indicated by the crosses is
already dead. In the center of
the diagram is shown a small
Cereus where the growth is entirely
dead only stubs remaining with
scattering plants of Salicornia rubra.
Beyond this is a large area of
this last plant with two living
islands of Aristichis spicata holding
plants slightly higher than the sur-
rounding. Below this is the
open barren districts of plant
growth. Mosquitoes are getting somewhat
bad again but are not

nearly 20 Troublesomes as they
were under the last rain.

July 20. Tuesday.

Water gauge this morning
3 ft. 4 inches

Very hot and close all day.
Cook went in to Corinne today.
I spent the entire day at
the laboratory.

~~Washed~~ I ~~out~~ yesterday I
washed out some bits of
duck intestine fixed in Bigelow's fluid
and embedded them last night.
Worked at it until 11:30. There
was a crowd down from Perry
but I was too busy to meet
them.

Made a number of blocks for
mounting paraffin sections and
mounted two bits prepared last
night.

From studying the tabulated
water analyses I find that
a sample from the head of
Channel 1 (Station as it leaves
the river) shows practically the
same content as water from Lake No. 2
(sample 1). Lake No. 4 (sample 2) East Pass
(sample 3) and the shallows of
Pintail Neck (sample 4)

Compared with sample 13 from
the flats on Pintail Neck and sample
14 from Lake No. 2 when both these

localities were blown dry by a strong wind, and sample 15 from Brown's Overflow from the newly flooded flats, I find in the latter an increase of 7-9 fold in SO_4 , 4-5 fold in Cl , 4-7 fold in NaCl . This same ratio in the compounds NaCl and MgCl_2 increase. The sample from Brown's Overflow above contains CaCO_3 . CaSO_4 is not found in the river water but occurs in the other samples. The amount of $\text{Ca}(\text{HCO}_3)_2$ and CaCO_3 is greater in the river.

About 6 I went down Channel 1 as far as Lake 1. The channel is very low and stagnant. Many clams (*Arcochanta*) were exposed and in looking through a few I found several pearls. They were found imbedded in the mantle. Two were found in one animal.

July 21, Wednesday.

Water gauge at 7:00 A.M. 3 ft. 4 in. Very hot and close all day with little or no breeze. A haze obscures the mountains and is especially strong toward the south.

Went down Channel 2 this morning. One dead Cinnamon Teal was seen. There were no ducks in here however. Two Mallards were the only ones noted.

Pintail Neck has almost dried off again, water standing only in very shallow isolated pools.

Corixids are very abundant in the shallows here and must form an important food for wading birds. A large *Notonecta* is rather rather I. It seems to be found mainly in pairs under *Potamogeton*. When the water is 2 to 4 inches deep.

Placed two platforms in position with pens on them this afternoon. Bulrushes were placed on top of the pens so that the ends hung down on either side for about half the length of the pen. They were lashed down on either end so that the wind would not blow them away. This gave from one to three feet of shade at the back according to the altitude of the sun. The hanging ends give the ducks a slight screen from observation so that they are less wild.

Experiment 24 was begun this evening with two mallards in a solution of $MgCl_2$ in 10 quarts of water.

July 22, Thursday.

This morning the water gauge registered 3 ft 4 1/2 inches.

It was intensely hot again today. Put the launch in the water again this morning.

After breakfast took the long boat and I went up the river to the mouth of Brown's Drift and then went to the mouth in the rowboat. There was practically no current in the Drift and it was very shallow.

At the mouth a considerable number of Mallards with a few Cinnamon teal and Pintails were gathered. Five young Redheads perhaps 2 weeks old were caught here in the shallows without much difficulty as they could not swim deep enough in the shallows to escape detection.

Godwits were common here and two were shot.

No sick birds were seen. Gathered the major portion of the skeleton of a White pelican that has been macerating here.

~~This morning at six I went down Channel! for garpox and gathered a red dead clam (Kamovanta walrusensis) and opened them. Four oysters that were~~

July 23. Friday.

Last night I visited Graham
Davenport at the Bear River Club.
I had heard shooting during
the afternoon and as I came
up to the wharf found feathers
of a freshly cleaned mallard
floating on the water. I picked
up the tail and kept it. These
birds shot all the ducks in
the state this spring much to
my disgust.

Water gauge this morning
set $9\frac{3}{4}$ inches. It was cloudy
and cool all ~~even~~ day with
rain threatening. None felt the
~~relief~~ relief from the glare of the
past few days was welcome.

This morning I brought
three young Gadwall and a
young Redhead into ~~the~~ the
of the platform pens. These will
be used as controls to determine
that ducks will live under
the experimental conditions imposed.

The birds in pens 1 and 6
the large pens in the river do
not put on flesh as they did
last year but I attribute this
to the time of year and to
the fact that most of them
are young birds. They are
not fat but are in good

This morning I went down
3 1/2 in the little launch towing
a rowboat. The little launch
has been painted a lead color
and entirely overhauled. It
does not leak now ~~was~~ ^{is} ~~not~~
all. The bow has been built
up too so that there is
no trouble with the waves.
All together the boat is very
satisfactory.

The drop in the river is
very noticeable here in the
overflows. Though I went
down about as far as usual.
The flats at the mouth of
3 1/2 ^{up} ~~from~~ ^{large} mainly dry
but below there was much
water.

Great banks of ducks lay
as far down as slaughtered
point. There were large numbers
of Mallards as well as
Gimmam or Teal and Pintails
as Spermills. very many.

One sick Redhead an adult
male was picked up as well
as a 3/4 grown mallard.
Besides these we caught four
young green-winged Teal (nearly
grown) and an adult
that had had the feathers of
one wing clipped. I did this
with several last fall on or

two of which escaped me
but it hardly seems possible
that this is one of the
same birds.

I went down past
Biglow's Point and found a
good channel all the way.
Carp swarmed in the overflow
and out on the flats. They
are digging up great quantities
of the Potamogeton.
Shorebirds were abundant.
I collected one Goshawk and 11
Western Sandpipers.

Sectioned and mounted
some Mallard intestines this
afternoon. Raza is too dull to
do good work.

This evening we moved the
duck pens in the river and
found that the carp had dug
a hole beneath one of them
15 inches deep right up to the bank.
They are a great nuisance.
Three young ducks escaped
during the moving.

A good many ducks are
flying up the river on the
evening now. In fact with the
familiar water they must be
hard put to it for food at
times.

July 24 Saturday.

Water gauge at 7:00 a.m. 3 ft. 4 $\frac{1}{4}$ inches.
Clear (and hot all day today).

July 24 is Pioneer Day in Utah.
The day on which the first
settlers entered the valley.
It is a state holiday celebrated
by every one.

John & Otto and family came
down from Perry today. Fred
Hansen (& wife) were down and
we had a big dinner with
ice cream and desert at
noon. There was a crowd
at the engine house at the cross,
above also. Otto has a
wagon box balanced in the
forewhale of a wagon that
is just the thing for travel
across the flats. It pulls
much easier than a four wheeled
vehicle.

Just this morning I found
the young mallard secured yesterday,
in ~~John's~~ dead end and spent most
of the forenoon in working with
it and in attending to my
other birds.

To prevent carp from digging under
the large pens. I had Bailey cut
up some old boat racks made of
1 $\frac{1}{2}$ inch stuff, in lengths of
18 inches. These were nailed to
a 1x4 at three quarter inch intervals

like the teeth of a rake.



The free end was sharpened. Two, even, made one for each side. These were pressed down in the mud one for each side of the pen. They can be pulled up and moved should necessity arise. There is only a hundred feet or so of the bar on which these pens rest and I do not care to have it all dug up by the fish. It is considerable trouble to move the pens and besides disturbs the birds.

I have requested you not to go along past the laboratory in order that the birds in the experimental pens may not disturb. The chicks in the small platform pens appear curiously subdued and quiet. The drake mallard in No 4 (Experiment 24) was wild when in the large pen but now is much quieter. Usually the birds lie down when approached standing up and walking about only when I am quite near they do not bust against the wire when approached quietly unless I lean on the Great

of the pen in order that I
may be in better

Since removing the big drake
mallard to the smaller pen
the other ducks in pens
1 and 6 (the fresh water cure)
are less wild. He was the
first one to become excited always
and disturbed the others.
And in the afternoon Fred Hansen
and I went down the river
and out 3 1/2 in my canoe.
A small amount of water was
running out No 4 and more
was passing into the Nelly
canal.

A good many mallards were
flying this evening. Fred says
that he has killed 90 in 110 shots.
He says that now however he
has given up the market hunting.
He is now a county warden.

It was beautiful in the
evening. The color on the
mountains and across the
yellowing salt grass are
magnificent.

July 25, Sunday.

Water gauge at 7:00 A.M. 3 ft. 2 $\frac{3}{4}$ in.
The water is much clearer
and fresher appearing. Yesterday
in the evening I was in
swimming and found the
river water distinctly salt to
the taste. It is rumored that
the west canal above on
the river is very weak and
is threatening to break. The
water has been low now
for some time. When it goes
back to its normal level I
expect to see a good many
sick birds.

I worked most of the
day in the laboratory. In the
afternoon was out 3 $\frac{1}{2}$ with
Jim Stokes. Nothing out of the
way was noted among the
waterfowl. Three men or two
men and a boy were seen
catching carp on the flats. They
must have come across from
Promontory.

I brought in a quantity
of *Potamogaster pectinatus* from the
train. I packed of 3 $\frac{1}{2}$ and
gave it to my controls and
to the young ducks in the
fresh water pens. The young
ducks seem very fond of it.

July 26 Monday.

Water gauge at 7:00 a. m.
3 ft. 2 ³/₄ inches. The water in the
river is rising slowly. It was
cool early in the morning but
intensely hot during the day.

I found the birds in Experiment
25 dead this morning and
spent much of the day in
working with them. Full notes
were made of that experiment.
~~Monks~~ double-crested cormorants
were of interest of *Graculus* major
in the afternoon.

Had Bosley build another
pen of inch mesh wire and
also had him clean up the
platforms used in experiment 25.
The mud was scraped off and
then the platforms and pen were
taken to the river and well
scrubbed. After this they were
placed in the sun.

In the afternoon I sent
Bosley to count Brown's Bonfow.
He found no sick birds. He
sent Graham Davenport who
had been across the bay.
He reported that he had seen
no signs of sick ones.

Cool went in to Corvina today
and did not return this
evening.

July 27, Tuesday.

Water gauge at 7:00 A.M.

3 ft. 2 ¹/₄ inches.

Cool today, with a strong south wind. Sky overcast much of the time. In the afternoon it rained somewhat and heavy storms passed to the south. And then went on up the river. The wind was strong for a few minutes and shook the laboratory violently.

Early this morning I went out 3 ¹/₂ and then down Kelly's Canal in a row boat. There was quite a stream of water going out the canal but the water in the old river channel was low. The Potomac has sunk below the surface to a large extent and did not bother us much in rowing.

Great numbers of Coots were gathered in here as well as many ducks. Clumps of bushes were filled with young ducks, young coots and a fair number of Cinnamon Teal and Pintails that had shed their wing feathers and were unable to fly. As we entered these clumps the birds splashed out ahead of us and glutted away.

Many however refused to come out
of the sheltering growth and
swam to one side and hid
or eluded us in other ways.
A few birds ran out in the
grass and these were easily
captured. I think that many
more flappers were in here
than we saw. It was easy
enough for them to hide in the
dense growth.

One sick Cinnamon Seal and
a young redhead that was
affected were captured.
All told we secured the following

Cook (young)	8
--------------	---

Redhead (young)	4
-----------------	---

Cinnamon Seal (2 flappers)	4
----------------------------	---

I found one ~~young~~ immature
spoonbill dead.

A sick Cinnamon Seal that
I shot on the wing had the
intestines intensely irritated.

The water down here was
clear when we got away
from the canal and rather
stagnant.

Cook returned from cooking
this evening and I received
mail and supplies.

Notes on dissections made today
follow.

July 28, Wednesday.

Water gauge at 7 a.m. 3 ft. $3\frac{1}{4}$ in.
Cool this morning with a
strong south wind. Went out
3 $\frac{1}{2}$ this morning and down
in the flats. The rise in water
and the ~~case~~ strong south wind
combined have covered considerable
areas again. The shore bird flight
seemed to have passed for the
time being. And a letter
received from Dr. Fisher yesterday
he suggested that I examine
the ovaries in early migrant
females in an endeavor to
determine whether or not they
have bred this season. I shot
three godwits, three Sitts and
several Western Sandpipers.

One still, one godwit, and
three Western Sandpipers proved
to be females. The ovaries of
these were hardened in Zenker's
fluid.

Most of the ducks were far
down on the bay.

On walking through the mud
in growths of Potamogeton in the
channels I picked out clumps
of brown sediment. Some of this
was taken in a bottle. On
examining it under the microscope
later I found many of the
elongate yellowish brown brachia

in that I have noticed before
and ascribe the color to them.

On the return I captured
a male Pintail that was
almost helpless. Notes in, if follow.

Many of the Pintails, nearly
all of the Spoonbills and a large
proportion of the Cinnamon Teal
have changed and are now
in molt. The Gullwallow too
have gone into seclusion.

Practically all of the ducks
have forsaken the river.

Nearly all birds have finished
breeding this season. There
may be a few Marsh Wrens
still nesting and Barn Swallows

are raising a second brood
but others are through for
this year. Savanna Sparrows
are gathered in loose flocks.

Magnus forage in bands along
the river and in the evening
gatherings of Barn Cliff Bank

and the swallows
come in to roost in
the rushes. Geese now are
full grown and are seen daily.

Heretofore it was a rare matter
to encounter them.
The mountains were very
clear today and I took
several pictures.

July 29, Thursday

3 Water gauge this morning
just even.

With a strong south
wind a huge of smoke has
observed the mountains
surrounding the Valley. Because
it is so dry there have
been several fires on Little
Mountain to the north and
~~down~~ last night I saw a
huge mass in the mountains.

This morning I went down
to Ned's camp in the canyon
and then out into the old
river channel in a rowboat.

Four duck nets were joined
together on poles making
one long net 25 feet long. This
we set up at the end
of a clump of bulrushes
concealing the ends and
making a semicircle of the
net. Then we drove
through the dense growth
heading young coots and
ducks before us. Though
few of the birds would enter
the net it served to drive
many out of the water
into the short salt grass
when it was easy to see
and capture them.
We tried this plan

out ~~the~~ clumps of rushes
 and secured the following
 Spoonbill young 2
 Coot 5
 Cinnamon Teal 6
 Redhead 1

As far as sport is concerned
 this is much more fun than
 shooting the birds, and is
 a much more strenuous
 exercise too. When captured
 I tie the birds feet together
 loop a bit of string
 around the two humeri
 to hold them on the back
 and the bird is then
 helpless. It is then placed
 in the boat and covered
 with dry rushes or fresh
 cut ~~Scirpus~~. This is sprinkled
 with water as the birds
 seem to feel the heat a
 great deal. They must not
 be left in here too long, largely
 before untieing them and
 placing them in the pens I
 have been taking anal temperatures
 from very surprisingly. In
 bringing the birds out of the
 boat one at a time as if
 several are brought at once.
 They ~~struggle~~ struggle and in
 consequence raise the temperature
 up. I find that a bird

of small size that is a hot
and that drops in water
has the body heat markedly
reduced in half a minute
even though it be still alive.
In dead birds dropping
into water unless I can
get to them at once I do
not record the temperature.
With woodrats the loss is
slight and with mammals
it is practically nil.

I had a Magpie dropped
within 35 yards of the road
in the overflow drop.
5 degrees below what it
should have registered before
I could get to it. Now
I am making an effort
to determine the sex of each
bird whose temperature I
record.

The Pintail secured yesterday
was dead this morning and
was found to suffering from
shot poisoning. It was much
interesting in this case as it
is the first one that I have
found personally in immature
Mallard secured July 18 last.
A single No. 8 shot in the ventricle.
The ducks in the pen
trample the dead birds and
apparently pay no attention

to them. This bird was
just and brought out
the live birds I had actually
given it. No more. I was
then told a good.

This afternoon I had
Booby make some more racks
of J. laths for pen No. 1 and
these were put in place this
evening and the pen filled
in with the carp head
then digging. We worked at
this until 9 o'clock.
It requires considerable
gain to put these birds
down and will have to
lay in another supply. The
Spring ducks are very
flycatchers and ~~unwilling~~ every
insect that enters the pen.
Bluebottles attracted by the
odour have a great effect.

July 30. Friday-

Water gaug. at 7:00 A.M. 3 ft. 1 inch.
This morning at 6:30 it was
cool and pleasant but later
during the day it became
quite hot. Worked at the laboratory practically
all day.

The Mallard ♂ in Experiment
24 was dead this morning
and a critical dissection was
made of it.

After dinner with Bosley
I made a short trip down
3 1/2 on the launch and
secured some Potamogeton for
the Glucks.

The flats here are drying
rapidly at a point where the
mud was first exposed. I
found a peeling crust forming
~~that~~ the mud was moist beneath as
in the barrens. The d. gets her
name from being drawn up by
capillary attraction through
surface evaporation and
deposited. ~~the~~ Considerable areas
immediately at the mouth
were covered in this way.
When water rises and dries
this then will be sick birds
caused by it.

Hansel's team ran away
here this afternoon starting

by Cook's motorcycle and took
down most of the telephone
line. It was repaired by
evening however.

Maggie's have been troubling
in somewhat by straining
muscles. ~~so~~ This evening I
cut up some apricots and
put a crystal of Erythrin
sulphate into each flat and
spread them around.

August 1, Sunday,

Water gauge at 7:00 a.m. - 2 ft. 11 ³/₄ in.
thermometer 66°. A cool breeze flowing
so that it was almost cold.

Arose at 6 and packed a lot
of stomachs that had been dried
yesterday. Attended to the birds.
Found one dead spoonbill in No 6
and coot that was looking dumpy.
left for Corinn at 8:40 arriving
at 11:25. The weed growth of
the summer has obscured outlines
and changed the appearance of
some parts of the shore line,
noticeably. I see a great many
sunflowers.

Near Kindsen's there was a
sick Pintail in the river ~~at~~
farther up were many Mallards
and Redheads but no sick ones were
noted.

A gasoline engine has
been placed on the river bank to
throw water into the Chesapeake
Bay. This is almost dry now.
I am certain that if this is
done there will be sick birds
there.

Ate dinner at the hotel in
Corinn. Boshy with me.
Received my mail and bargained
for 5 bushels of wheat and Barley
mixed with Mr. Jerry.
I had intended going to

Agreed on the afternoon train but
from ~~Mr. H. H. H.~~ an Clarence Acheson
and Mr. Ryan and his partner for
the Corvair Drainage District company.
I learned of sick birds on
a marsh on Salt Creek where
they have not been known before.
This region can receive some
surplus drainage water from Bear
River but there is no possibility of
water from the Malted River entering
it. This would eliminate all
possibility of trouble from sugar-
factory drainage. I decided
at once to visit the locality
and secured a room at the
hotel.

Part in part of the afternoon in
writing a long report to Mr. Fisher
on work of the past two weeks.

Met Mr. Snyder a drainage
engineer from Salt Lake City who is
working for Acheson & Ryan. He has
visited the Davis Lake country and
says that there is great
small lakes west and south of
Davis a small town where many
traps may be laid. Davis is 22 miles
from Davis Lake. Hay and greenwood
who hold office in the Judge
Building, Salt Lake City have the
project of some sort near Davis
Lake can give me information
regarding the duck situation. Mr.

Ray is the better man for me to see. Both men are sportsmen and will be glad to give information.

Mr. E. Snyder told me that 1906 he helped stake out the Western Pacific at the point where the line crossed the so-called Great Salt Desert about 7 miles from the mountains to the west he noted several dead chucks and a dead hawk lying in the salt plains. A fact perhaps not of great significance but still worthy of comment.

I have heard talk here of the trouble caused by the bite of the deer fly. The one with blotchy wings. From Mr. Adams this evening I obtained a thorough account of the trouble.

This ailment has been known for 30 or 35 years and was attributed at first to water taken into the system. Of late years it has been ascribed to the bite of the deer fly.

Mr. Adams ~~was~~ ~~the~~ underwent an experience with it several years ago and described the malady as follows.

He was bitten about 2:00 P.M. while in a field attending to an irrigation ditch. Bites took effect on the ear and on the side of the neck near the glands.

Returning home about six he was overcome with a great lassitude, a disinclination to do anything and a lack of interest in affairs of importance. This was followed in two hours by aching in the muscles of sides and back and of the body in general accompanied by a general trouble evidenced by a dysentery. At 48 hours the fever began to itch and burn this continuing for a week. The cutaneous was much irritated, angry, soon in appearance and the skin about the bite sloughed. The bite of the neck swelled and suppurated as a sort of boil and was finally lanced in a week. In two weeks most of the symptoms disappeared. Symptoms were those of in general of a mild typhoid and diagnosis was typhoid by two physicians or something similar to it. Dr. J. M. Dart (very initials) of Salt Lake City a noted local diagnostician called in said that it was not typhoid and that he did not know what it was but that it might be a malarial attack.

Four periods occurred twice each day with a temperature of 103° to 104° . These were followed

by severe chill.

Mr. Hart that afternoon visited the Chesapeake Bay and was himself bitten and infected. Returning to Salt Lake he underwent much the same symptoms as Mr. Adams. Doctor friends pronounced it typhoid and even induced one of them to refuse to undergo treatment for typhoid. Since that time the trouble has been generally attributed to deer fly bites and it is known that not all flies give it. The trouble is confined to this immediate vicinity in Box Elder County and has not been observed elsewhere in the State. The localization has long been known and formerly the boils on the neck were known jokingly as Bear River Badges.

There in cases is frequently accompanied with delirium. Boils are frequently followed by others lower down. Sometimes three of these occur in succession each one requiring lancing in turn.

Now it so happens that this trouble appears each year ~~the~~ about July and continues through August. During this same period the Jack rabbits become infected in some way so that they are lethargic, can barely

Keeps out the way. Many of them
die. It is the common belief
that the flies bite the dead
rabbits and then communicate
this infection or an infection to man.
There is no ground for connecting
the two & except that they
occur & synchronously and that
flies are seen on dead rabbits.
Sick rabbits were reported seen
yesterday by Dave Hewlett. He told of
seeing one dead one with holes bitten
in its carcass.

July 14 I saw one. William White
said to be suffering from the
trouble. Several cases have
occurred this year. Animals
other than man (i.e. horses,
cattle etc are not known to be
affected.

August 2, Monday.

This morning was up
at seven. Cool and pleasant
last night so that I got a
good nights rest. About nine
went out with Mr. Ryan and
Mr. Ferry to the salt creek marsh.
about 12 miles northwest of
Corinne. Saw for little mountain
the valley is level through
here and is almost all under
cultivation. Water for irrigation
comes from the Bear River
canal. Wheat and other grain

and alfalfa are the main crops.

We passed the north base of Little Mountain and found the marsh lying in a small valley at the southwest corner. After going in we passed near the Salad River. This is a very narrow stream that has cut for itself a deep narrow bed in the level of the valley. The stream is sunk entirely from sight. No trees border it and from a short distance the presence of the river would not be suspected in looking across the valley.

Arriving at the marsh I spent a few minutes in a small knoll an outlying spur of Little Mountain while waiting for a man to bring me a pair of boots. Some sage grew on this eminence and much Atriplex confertifolia.

From this hill to height of 60 or 70 feet I could see down the entire valley. Salt Creek rises from a series of springs at the base of the mountains to the south. One of these springs is fresh and the other brackish.

For four or five miles it flows
down as a narrow
stream and then reaching
the valley level spreads
~~out~~ as a marshy lake.
This is perhaps 2 miles long
in greatest extent at present by
one mile wide. ~~But as I~~

Passing this salt creek
becomes a stream again
and passing ~~off~~ the Sweet
point of little Promontories
flows down toward the lake.

The Bear River Canal flows
around this valley and
drainage. From it ~~crosses~~
flows into the marsh. This
drainage was freshened the
marsh and has permitted
the growth of aquatic and
marsh loving species that
formerly found conditions here
unsustainable. Formerly great
areas now given over to
salt grass and dense
growth of *Scirpus* were mere
open bardsens.

~~There is~~ I was told by
Mr. Fred W. Petersen, Tremonton,
Utah P. O. 2 who is in charge
of this marsh that there
is no chance of drainage
into this marsh from
the Malad River. And from

observing the deep cut
channel of the Malad I
can see no chance of water
from that stream reaching
this marsh even in maximum
high water.

A week or ten days ago
water from this Salt Creek
Marsh was turned into the
Mill Canal controlled by the
Bear River Club and so thrown
into North Bay. This has lowered
the water in the marsh
a great deal and one large
part of it to the west has
gone entirely dry. Four days
ago Mr. Peterson found
about 30 dead ducks and
four or five sick ones.

Sick birds have not been
known here before save that
in 1913 when shooting was
resorted to to drive the birds
from the Bear River marshes
to the south a few came up
here and a few sick ones
were noted.

The stream of salt creek
and the water in the
marsh of found distinctly
saline to the taste. The bed
of salt creek was in clay
which in some places had
~~remained~~ ~~not~~ become incrustated

from deposits from the water;
crossing the hay field
I crossed a dense growth
of *Scirpus* (specimen) four
feet tall. This is a species
that I have not seen before.
A small amount of *Scirpus*
paleudorus was noted.
A *potamogeton* was abundant
in the open water, forming
dense growths with an
algae on the surface.
The mud in bottom was
a loose silts 6 inches deep
yellowish greyish or brownish
in color giving off a
strong odor of H_2S .
No black silt deposits were
noted.

I found the marsh in the
main about knee deep. a
broad channel led through the
center. On crossing this
I stepped into a chuck hole
and filled my boots.

Muskrat houses were abundant.
A species of *Rana* was common
and open water swarmed with
larvixids.

I had from 10:30
until two o'clock to
work here and worked the
lower two thirds of the
marsh thoroughly.

The following affected birds
etc were noted. All but a
few were dead.

Night Heron	1
Coot	1
Gadwall	1
Mallard	7
Redhead	4
Stilt	2
Yellowhead	1
Total	17

Muskrat 6 dead.

Post mortems on several birds
following in separate shots.
These birds had an affection
similar to that on Bear River.
My first thought was that
affection might have taken
place in the drying part
of the marsh above but birds
probably young Redheads were
noted that I was unable to
fly limiting their activity in
all ~~the~~ probability to the
marsh in which they were found.
Practically all of the birds
were found near the center of
the marsh near the channel.
Growth of S cyprus & a grass
formed islands here and
birds lay at the edge of
these on muskrat houses
or in the water near by.
none were found in the

at the border of the marsh
Six dead muskrats were
observed in a short distance.
With ~~some~~ so many present
this death may (with
some probability) be charged
to alkaline poisoning. A post
mortem of one revealed little.

On June Redhead and
myself found the kidney
affected as it was in the
Mallard killed with MgCl₂.

It was very hot on the
marsh and returning to the
cave at 2 o'clock I was
glad of a drink and a
light lunch.

Leaving the W. Ferry
Grove to the top of Little
Mountain. A small canyon
in the north side made
passage possible by a narrow
winding road. We crossed
two old lake beaches just
below the top one of them about
70 feet above the other. At
the top of the mountain
was a hollow containing
about 100 acres that in to
grain.

Little Mountain was covered
with sage brush 12 to 18 inches
tall with a scattered growth
of low chrysothamnus some of

which was just coming into flower. A low growing *Rhus* was seen also with a few shrubs of *Crataegus*. On the highest part of the mountains were a few cedars. I saw a few scattered plants of *Berberis*. There had been ~~a~~ ~~water~~ too here here at one time. There was no water.

From the summit I had a fine view of the valley though it was much obscured by haze. Could make out the Duck Club readily. A well at the ranch house at the foot of the mountain to the north had been dug to a depth of 8 or 10 feet. The water was very salt and though thirsty I drank little.

Orthoptera were very abundant in the sage as was a fly. Dragonflies were abundant and were doubtless feeding on the cattle.

One superficial Duck was found in the marsh.

I took a water sample near the center of Salt Creek marsh and another from Salt Creek. Reached Corinne at 7:30.

August 3. Tuesday.

A fine Cool night last night.

Had two expense vouchers witnessed in Corinne this morning. July expense was \$150.39, the other was a reimbursement account for \$4.85

Left Corinne at 8:45 had nearly an hour's wait at Brigham and reached Ogden at 11⁰⁰. Much fresh grooming along the track from Corinne.

A large dark red cherry was still in the market at Brigham.

At Ogden I bought some 4 foot inch mesh wire for another large pen and ordered it sent to Corinne by express this I cannot purchase in Corinne.

Went to the Ogden State Bank made a deposit and talked for half an hour with him.

Had a number of small purchases many of the officials make and this occupied much of the afternoon. After completing these

I wrote up the mass of notes secured yesterday.

Very hot wet day.

In the evening Mr. Bigelow took me up Ogden Canyon in his car. We had dinner and spent the evening at Miss Kiesel's cabin. I met Mr. & Mrs. Kiesel's (Miss Kiesel's parents) also Mr. Dwyer, and Miss Rick.

It is very cool and pleasant up here. The main objection that I have is that the Canyon is narrow ~~and~~ so that I have a feeling of being shut in.

Olive backed Thrushes were calling in the evening.

Mrs. Bigelow has been very ill but now is able to be up and about.

Returned to Ogden at 11 and retired about 12:30.

August 4, Wednesday

~~It~~ I was ~~so~~ not last night. ~~that~~ I was able to sleep but did not feel refreshed upon awaking. Arose at 6:00 had breakfast and caught the 8 o'clock electric car for Salt Lake City arriving at 9:00.

Went to Schramm-Johnson's first and had an error in my July bill straightened out and ordered a few chemicals. Then to the Mine

and I met the supply Co for a few
laboratory supplies.

Called on Mr. M. Cornick. He
told me that the marsh at
the New State Game Club had
entirely drained. He told me
that why this was done
was that it spoiled the fall
shooting as it killed out the
fowl. Other men have told me
the same thing. I tell others
say that it makes no difference.
Be that as it may I can
see no other way to avoid a
mortality on this marsh. Mr.
Cornick said that he was
going to start an agitation toward
gathering sick birds and placing
them in fresh water that they
might recover.

Talked with Mr. Chambers for
an hour. He said that he
had seen two or three sick
ducks and a few dead ones
in a small run near Salina.
Just above them was a small
alkaline pool. This was drained
and the trouble ceased.

For a few days trouble
threatened at the New State Game
Club. The marsh had been drained
save for one small lake. Above
75 birds died on this. But
finally it was drained. The

marsh that was entirely dry now.

Some truth was reported from ponds near Davis and Clear Lake. Chambers was going to investigate this tomorrow.

A railroad man, Mr. W. G. Triplett had reported about 75 gulls apparently in a helpless condition in a pool on the alkali flats 4 miles west of Lucin. This pool was formed by waste water from the water tank. There was some uncertainty as to whether these birds had been sick or not. This Mr. Triplett lives in Ogden.

Mr. Chambers asked me to give him some advice as to a topic for a paper to be read before a game wardens convention in San Francisco. I suggested something on the introduction of elk into the state, or the raising of trout for ~~commerce~~ the table. But finally said that I believed that the best thing would be a paper on "Shall we prohibit the sale of wild game birds or not?" Discussion to take the form of a description of the manner in which the sportsmen at the Bear River Club hunted ducks the numbers killed and the manner of

their disposal on the market.
It is without doubt the fact
that ducks can be sold that
causes the constant violation during
good flights of birds. If these
ducks could not be marketed
they would not be shot. For
any true sportsman it is a
paltry matter, ~~to~~ to obtain a
few cents for what birds he
can kill. As for the chase
of the birds, the outing, the
fresh air should be considered
sufficient return for the expense.
incurred.

Ordered this coplin staining
jars from Durbin Dental & Surgical
Supply Company. Also 100 Cabels.
Went to a dentist at three
and found that a tooth from
which a filling and one cusp had
been broken had to be crowned.
Fortunately the nerve had been
removed. This work required until
7:30 and cost me ~~about~~ \$10.00.

Returned to Ogden leaving Salt
Lake at 7:00 and reaching Ogden at
9:00. Had dinner about 10
and retired at 12:30.

It was very hot in my
room and in fact was intensely
hot all day. The radiation from
the footstills makes it warmer
than it does at the

laboratory in the center of the
flats.

August 3, Thursday.

Rose this morning at 6⁰⁰.
At breakfast did some writing
and left for Corinne at 9:20.

Chickens at Brigham have just
about disappeared. Reached Corinne
at 10:27. There is absolutely no
snow at all in the mountains
here and I learned from Mr.
Harry Finch that the small
streams in the mountains are
very low. He had run across
into Wyoming for the chicken
shooting. Reported great
numbers of green winged teal
on all of the streams through
the mountains.

At Corinne I bought two
bundles of lath, 7 pieces $1 \times 4 \times 12$
and 3 pieces $2 \times 4 \times 12$ of B. M. Shaw
These were charged.

Purchased 2 alt. commercial, 5 gallons
gasoline, a gallon of polarine oil,
2 lb shingle nails, 6 door knobs,
and 3 12 quart galvanized pails.
Also paid for 300 lbs of
grain to consist of wheat & barley
mixed. This cost me $1\frac{1}{4}$ cents a
pound. 110 lbs went down the
river Sunday with Bosley &
this makes an excellent
duck food.

Bosley came up with the
launch and we had the
supplies transferred to the river
and left at 1:00 for Duckville
reaching that place at 3:45.

It was intensely hot
though during the first part
of the journey we had a
strong breeze.

There were a good many
young Redheads on the
river but not much else.

Water is being pumped from
the river to fill the Chesapeake
Bay.

At Duckville we had something
to eat and then proceeded to
take care of the supplies
brought down.

Went down No 1 trying to
capture some young Redheads
but lost them. I found a
male mallard that had
just died.

Bosley promised to paint the
laboratory during my absence
but did a rotten job so
that it may have to be done
over. I furnished the paint
personally. The building is
a dark grey with frieze boards
and window moulding white.
In the evening I called
on Mr. W. A. Neal who is at

Bear River Club covering some
plumbing.

A good cool breeze came
up in the evening.
The carp now gotten away
with my pens in the river
during my absence. One of
them had been dug out at the
end of the hole there is a hole
under it 5 feet deep.

Water levels during the past
few days as taken by Bosby are
as follows.

August	2	3 ft 1 in.
"	3	3 ft 0 in.
"	4	3 ft 1 in.
"	5	3 ft 3 in.

I have an idea that these
are not very accurate. ~~He~~ had
made two mistakes in entering
them. [later these]

August 6, Friday.

Water gauge at 7:00 a.m.
3 ft 2 1/2 inches. Intensely hot
all day long. A storm threatened
toward evening and a heavy
rain passed from Corinne south
along the foothills. Another crossed
south of us from Promontory Point
to Willard.
I worked at the laboratory
all day. Arranged platform pens
for side experiments and placed

birds in them. These pens
have the platform covered with
river sand which is pat-
ted down to make it smooth
otherwise it is very hard on
the ducks' feet. The top of
the pens are covered with
bushes. Two layers of them
are put on. One layer has
the heavy butt ends of the
sticks covered with one edge
of the pen while the tips
project three or four feet beyond
the other side. The second
layer has the tips projecting
on the opposite side. Two
willows as long as the
pen and 1 to 2 inches through
are cut. These are lashed by
wire to the top of the pen at
the back with wire and then
drawn down and lashed in
front. These hold the rushes
in place and prevent their
being blown off by the wind.
They leave off the ~~pens in~~
birds in the pens for 24 hours
giving them river water and
food in order to accustom
them to using the pens.
Various solutions are then
introduced.

Borrowed a wheel barrow
from the Bear River Club this

morning.

At the evening it was very cool and pleasant.

There was quite a flight of Pintails and Mallards down the river this morning continuing until 11:00 o'clock.

Trails, Flycatchers have returned and I heard Black-bellied Plover passing over.

Mosquitoes are not at all bad now even at Eckett's.

Blow this are very abundant.

Visited Eckett's in the evening.

August 7, Saturday.

Water gauge at 7:00 a.m.

3 ft $3\frac{3}{4}$ inches. Very hot all

day today. Toward evening

a violent wind storm blew

a cloud of dust up along

the foothills obscuring the

mountains. At dusk the

floating particles of dust made

a beautiful red sunset. The

glow extended for miles along

the Promontory Range.

Albis returning to the rookeries

were hard put as they had

to fly at right angles to the

wind.

It was necessary to move

the large fresh water No 1 & 6

as the carp had dug away
under them badly. Under the
end of one pen water was
nearly hip deep. A split in
the wire allowed large
carp to enter the pen. On
checking up my bands I found
that I had three more
Redheads than the records showed.
They must have come in
through the hole in the bottom.
There are several outside
trying to get in every day.
The pens were entirely
surrounded by racks of both
18 inches long & the Kup. The carp
out.

A mallard died today
from lead poisoning. Notes on it
follow.

About three I went out
Channel 3. There were great
numbers of ducks out on the
flats but no sick ones were
encountered. Thus far the water
has been going down with
only slight oscillations. I
found on the portion of the
flats here that had been made
very early an alkaline crust
similar to that on the flats
in front of the laboratory. On
lower levels the encrustation
was forming at the borders

of cracks while the mud
between the cracks was still
kept moist. In these places
however the surface mud
had a strong saline taste.

August 8, Sunday.

Water gauge at 7:00 A.M. 3 ft 5 $\frac{1}{4}$ in.
It was intensely hot all day
with a south wind that blew
the smoke to the north and
obscured everything south of
Promontory Point.

I put in most of the day
at the laboratory attending to the
experiments now in progress.
Two Redheads given Peters alkali
scale show every symptom of the
malady.

Afternoon a Mr. Hoffman and
a Miss Wallberg (name?) drove
down from Brigham. They come
from the forest service in Ogden.
They were interested in birds
and knew a little regarding
them. The lady wished to see
some pelicans so I took them
down 3 $\frac{1}{2}$.

The water was very shallow
and I was able to get down
only as far as the small island
and scaped on bottom for a long
way at that. The boat does not
do nearly so well since the
propeller blades have been straightened.
Mr. Neal came down for the
evening.

There were great numbers of
Mallard and Pintail in South
Bay. In fact the whole state

were covered as far as I could see.

~~Water evaporation~~ f

From 1886 to 1905 the lake level according to the blue print in my possession has been steadily falling. In 1886 ^{June} the water stood at 11.5 ft. above the zero of the midlake gauge. At the lowest point in 1905 the water level was about -2.3 ft. a drop of 13.8 ft. In ^{late} 1900 the water stood at +4 ft. but from then on the drop was rapid. The water level shown for June 1914 is +5.6 or a rise of 7.9 ft. in nine years. ~~This rise is in the~~ The water level varies during each year from 8 inches to 3 feet or more. Usually it rises until the middle of the year apparently about June though variations are not indicated and then falls until the end of the year when it begins to rise again. Since 1909 the water has remained at approximately the same level varying 1 ft. to 1.5 ft. each year.

The great rise in the lake level noted since 1905 would cause considerable difference in the height of the ground water table and also much difference in the drainage of the flats in the

mouths of the river to
eastern border. In the low
areas along the lake upon this
rise in ground would cause a
corresponding rise in the saline
held in solution.

Water evaporation from a fixed
surface at Goose Lake of the
lake is given as twice as much
during June, July and August as it
is during April and October.

This would cause ^{the} greater evaporation
on the mudflats from the time
that a slackening of the water
supply began to lay them dry
and this evaporation would
increase until August the water
level is ~~exceedingly~~ low because
of the amount drawn out for
irrigation and a failing supply
due to small amount of rain
and the low state reached at
that season by the snow on
the mountains. This constant
evaporation would ~~dry the~~ tend to
evaporate the ground water and
to concentrate the alkali salts
held in solution ~~on~~ the surface.
In many places where evaporation
was great enough alkali cruds
would form. As the higher
ground dries at the surface
evaporated capillary attraction
would draw more to the

surface to be evaporated in its
turn. ~~Even when~~ - In some
places the lay of the land
might be such that the
alkali crusts would not be
dried out sufficiently to be
visibly evident: in spite of this
the surface ~~high~~ of the flats
would be found saturated with
the alkali. This would be the
case ~~at the~~ on mudflat
elevated an inch or two above
the water level when the
ground water is practically at the
surface. Now let the water
be blown out over this surface
by the wind and these salts
would be immediately taken into
solution. In a narrow skin
of water such as would
spread over these mud at first
solution would be highly
concentrated especially towards
this be true right at the advancing
edge of this water. Again rain
might form pools ~~between~~ in
slight depressions causing
concentrations. Birds following
eagerly along this advancing
water to feed on the seeds of
Sotamogeton floating up in it and
the myriad beetles struggling in
the water would obtain quantities
of the salts. The water

of the bays already contains
these in solution and the birds
have been absorbing them into
their systems. With the added
load they are unable to throw
it off and succumb. transferred
to water that is fresh and
they recover.

August 9, Monday.

Water gauged at 7:00 A.M.
3 ft 6 ¹/₄ inches. The current in the
river was almost dead and
the water quite salt to the taste.
During early forenoon the sky was
overcast but later the sun
came out and it was intensely
hot. The mornings now are cool.

Except for a few scattered branches
down near now disappeared from
the willows. No down is now
seen floating on the river surface.
Formerly it was abundant.

Until a current of water
was flowing into the mouth of
Browns overflow toward the river
but in 500 yards the water
became dead. The water coming
in from the bay was quite saline.
There is more than double
the area of water on north bay
now than there was at the time
of my former visit. This comes
from the canal supported by the
Bear River Club.

In the open flat here I found that the mud first laid bare was now covered with a white alkaline crust. I made a profile here getting the elevations and distances from the edge of the overflow. I found that the highest point was 18 inches above the present water mark. The highest level consisted of a broad flat slightly higher ~~at~~ toward the overflow. It has a crust formed $\frac{1}{16}$ inch thick at least. With the shoulder blade of a steer I scraped up 5 pounds of this material and took it back with me. Below this toward the overflow was another bench covered with a crust in formation. The soil was still damp. The mud was very bitter as well as saline apparently with CaCl_2 . Another bench below this was slightly saline and below ($6\frac{1}{2}$ to 75 ft.) the mud had been newly laid bare.

Now on June 4, 1915 using levels obtained from my water gauge at the laboratory the ground would have been two inches above the highest point indicated in this profile. I can recall when this point was laid bare and when the mud was as fresh as that now newly uncovered at the

edge of the overflow. The portion covered with alkali was laid bare about June 17 and has not since been covered. During the steady evaporation since water has been given up leaving salts held in solution behind. At the same time capillarity has drawn up ~~fresh~~ other water from below to be evaporated in its turn.

It should be determined how deep this capillarity operates. J. Young. Bul. 61 U.S. D. A. Polack Salt & other salines in Great Basin Region. p. 26.

The second bunch (38-53) has been bare (again using laboratory water gauge levels) since June 22 with the exception of the period July 10 to 13 when it overflowed. I verify these figures.

Now it is evident to me that when the water level raises above these two benches that there will be poison laid open to ducks in their feeding. The probabilities are that lowered levels may have the alkali salts in them raised by that and be in themselves dangerous to bird life.

In judging on these newly flooded surfaces the birds get strong concentrations of

alkali salts. As noted before with water rising slowly on these level surfaces either through actual increase of water supply or through the action of wind the extreme water edge where the incoming stream is very shallow $\frac{1}{4}$ to $\frac{1}{8}$ inch perhaps the concentration much be great. With slight ripples the mixing of the salts would be increased and the solution rendered much stronger. Again in feeding here the birds gather more or less of the top surface, off it through the bill and swallow it. This would increase the

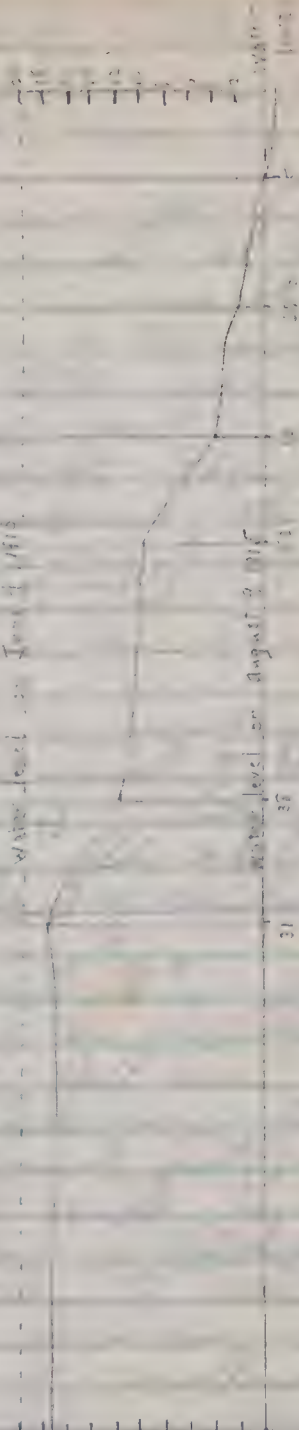
Before an amount of poison taken into the system. Before me I have a porcelain dish containing about 15 cc of water & perhaps 120 milligrams of crust from this locality. After standing 5 minutes without mixing the water was strongly saline. At the same time a bit of mud dried partially on a cloth was also very strongly saline. Thus proving this statement.

290 milligrammes of crust dissolved in 5 c.c. of water giving a very strong solution. In both these a sum of bubbles appeared on the surface as the water took

Inches
0 1 2 3 4 5 6 7 8 9 10 11 12

Feet
0 1 2 3 4 5 6 7 8 9 10 11 12

an alkali crust.
transmission bed.
Brewish grey
moist. loose earth
strongly saline. with
with CaCl₂
shoreline. earthy
earth damp. earthy
with saline
slightly saline
moist.
moist. newly laid
little alkali



0 - water level 3 feet 6 1/4 inches below top of rock on 22nd of September August 1915
20 - water level 1 foot 6 1/4 inches below top of rock on 22nd of September August 1915
Diagram showing
Subsidence on March of 1915

Aug. 1915

in the solution. This is a common appearance when the water is rising and flooding new areas.

Again as the water spreads over new ground it frequently runs out in cracks for several feet ahead of the actual water edge. In these concentrations of salts are great and birds feeding through them would likewise secure the soft deliquescent crust on either side. Crusts ^{usually} form first along cracks when such are present.

Aug 10, Tuesday.

Water gauge at 7:00 A.M.
3 ft. 6 $\frac{3}{4}$ inches. Intensity not.
Again today. The clubhouse is running short of drinking water too.

Went out 3 $\frac{1}{2}$ about 10
accompanied by Fred Hansen who wished to set some traps for pelicans. We were forced to leave the launch just below the Healy canal and found that the overflow is treated as a channel clear to Mud Point. Below this was some water. Thousands of mallards & Pintails were gathered in here. I caught two sick Mallards.

Most of the Western Sandpipers
have vanished but I saw a
number of Baird Sandpipers.

The Carps have been digging
around my duck pens again
and ~~it~~ had to be taken up
and filled in. They had dug
under the end and two Peellheads
had forced through the wire
gone under the pen and
been drowned.

August 11, Wednesday.

Water gauge at 7:00 A.M.

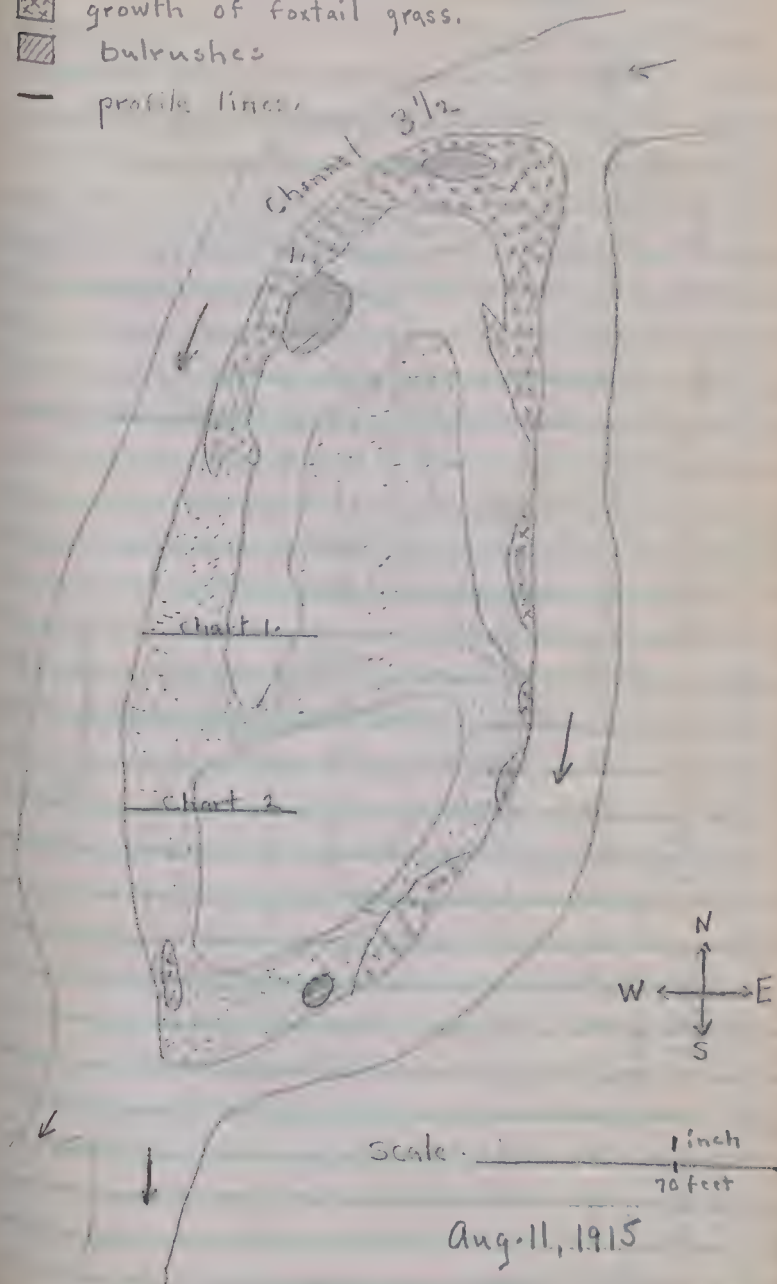
3 ft. $7\frac{1}{4}$ inches. Alt. is cool and
pleasant during the night here
and I slept very well. It
was not so warm today as
it has been.

Current is almost absent in
the river now. Practically no water
is going out the Bailey canal
and in the launch I was
able to go down only as far
as the cross channel from 3 to
 $3\frac{1}{2}$. The launch scraped in
entering $3\frac{1}{2}$ above Sacketts.

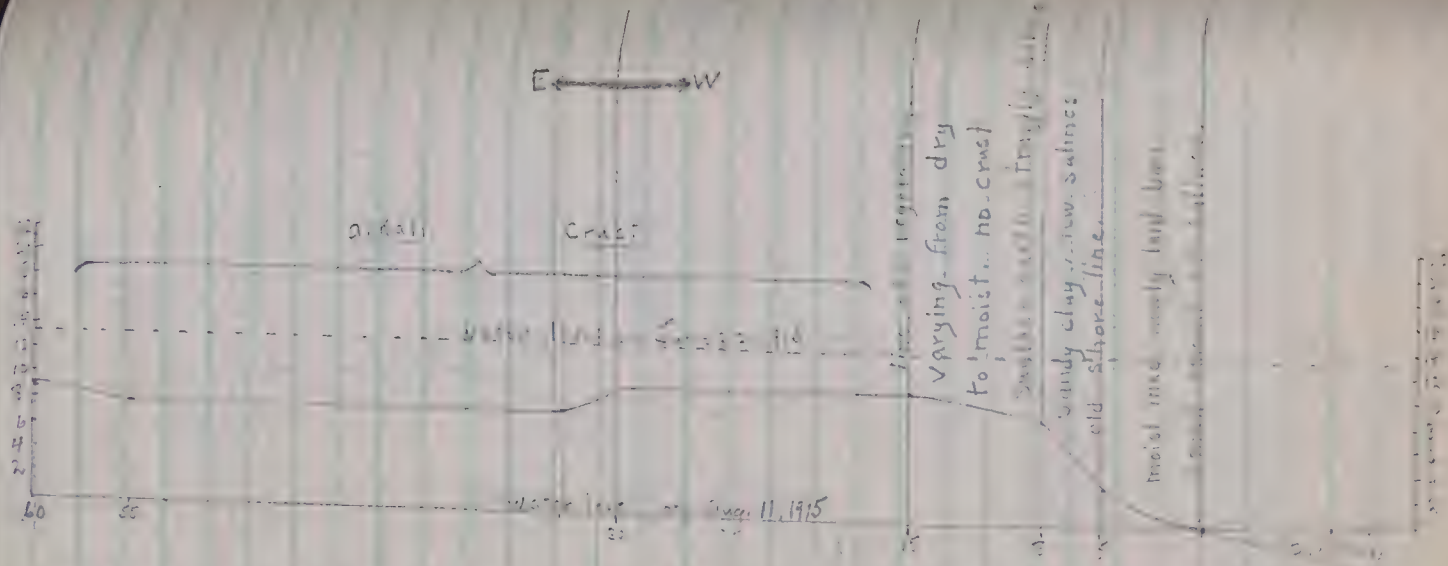
In going down $3\frac{1}{2}$ I
landed on a small island
and studied the alkali
conditions. A chart of the
island is given.
It will be seen that alkali
effluences have formed on a

Diagram of Island 3 1/2.

-  alkali surface cover.
-  surface still damp. strongly saline.
-  growth of foxtail grass.
-  bulrushes
-  profile lines.



Aug. 11, 1915



0 - water level 3 feet 2 inches below high water mark at range of Observatory August 11, 1915
 132 - water level 2 feet 5 inches below high water mark at range of Observatory August 11, 1915

Saline conditions at station 132. Looking South
 Chart 2

August 11, 1915

22
20
19
16
14
12
10
8
6
4
2
0

damp, crystalline
L about cracks
strongly saline

alkali clay

alkali
sand

Evaporite - dry
damp
very strong alkali

somewhat dry

very strong alkali

clean sandy clay

moderately saline
strongly saline

NOTE: High water mark on June 20, 1915

NOTE: High water mark on August 10, 1915

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A water level 3 or 4 inches below high water mark on gauge at Lake Mead, August 10, 1915
1915 () 2 feet 5 in () June 20, 1915

Saline conditions at Mouth of Channel 274.

Chart 1

July 1915

little less than $\frac{1}{2}$ of the entire
area of the island. In an
equal area lying a trifle lower
in elevation ~~the~~ surface is
still damp. Alkalis have raised
rapidly here however through
surface evaporation and there
is great concentration of the
salts here immediately at the
surface. In fact this concentration
is nearly as great as
that mentioned above. All that
is necessary is for enough moisture
to be given up to form the
crust. The remaining area
perhaps $\frac{1}{8}$ of the entire island
is ~~now~~ grown with forst and
bush. Now a rise of twelve
inches in the water level will
inundate this entire island
and immediately the soluble
salts will be offered in concentration
to such water as choose to
find here at this time.

Two profiles were made here
in lines indicated on the chart.
Using water levels taken at
the laboratory it is found that
judged on this basis ~~this~~
~~region~~ the portion of this region
covered by alkali efflorescence
has been bare since June 22.
It remains now to establish a
ratio between the rise and fall

The water here and at
the laboratory. The step ~~fixed~~
bank from 7 to 8 feet from the
present water of the overflow
has been a shore line for
some time. It is composed
mainly of clean finely
clay from ~~which the~~ the
surface of which most of the
possible salts have been leached
by the constantly passing water.
Thus far the trend of
the water level has been almost
constantly downward. This has
increased the areas exposed
to evaporation but at the same
time has not thrown the
soluble matter contained on their
surfaces again into solution.
Though the salts in solution in
the river have increased
still they are innocuous to
bird life as witnessed by the
fact that my captive birds
continue to thrive. This constant
downward trend of the water
level will explain the small
number of sick birds found
as yet.

Proceeding down the
overflow I found that $3\frac{1}{2}$
extended as a channel to
a point on a line with
Bigelow & Mud Points. Here it

began to spread out. For
more than half a mile here
were great areas of drying
mud. On the higher portions
notably those nearer the banks
of the overflow it found that
alkali efflorescence was forming
indicating the great concentration
of salts in the surface water.
These scales were brought at the
last isolated clump of trees
down the bay.

A box full of scales was
gathered on the island shown
in the diagram and brought
in to the laboratory.

Aug 22, Thursday.

Water gauge at 7.00 A.M.
3 ft. $7\frac{7}{8}$ inches. Very hot again
today. Today I spent practically
the entire day in studying
birds dead in my experiment pens.
Received mail and supplies from
Corinne last night.

Two more bundles of lath were
brought down and I had Bosley
make them into racks of full
length lath. With these we
built as fence three fences outside
our pens so that the carp
cannot get at them. The ends
of the pens had been dug
under and were all filled
in in good shape. Called on Mal

is the evening at the Bear
River Club. He gave me the
clipping that I have on the
next page. Evidently my visitors
of last Sunday were good
press agents.

Twenty young Redheads were
captured during the day and
placed in the pens. They come
into the racks surrounding the
pens and are unable to get
out.

There is quite a flight of
Mallards and Pintails down
the river every morning.
I think that the birds are
coming from the east end of
North Bay and perhaps
from the Chesapeake. The flight
continues until about eleven.
During the evening I hear them
also going up stream. Many
are doubtless feeding in the
grainfields. Heading the grain
has been going on since Aug. 1.
Yesterday a big fire started
on the west side of the Promontory
range and made a great volume
of smoke. Today farmers on the
eastern slope were back firing in
order to save their grain fields.

DUCK MALADY DUE TO ALKALI, FORESTERS SAY

Ogden Examiner Aug. 10, 1915

Advance Theories on Disease
Being Analyzed by Dr.
Alex Whetmore at
Duckville.

WATERFOWL ABUNDANT
NORTH END OF LAKE

Scientist Experimenting With
Inoculated Birds in Effort
to Find Cure.

The theory that the duck disease which affects the ducks on Great Salt Lake each year might be due to the alkaline properties of the water near the shore where the ducks feed was expressed yesterday by Miss Rosalie Holberg of the forest service, who with Irving N. Hoffman, also of the service, made a trip to the federal experiment station conducted at Duckville by Dr. Alex Whetmore, on Sunday. Miss Holberg and Mr. Hoffman went from Brigham City to the lake and were taken by Dr. Whetmore for some distance down the channel of Bear river into the lake in his launch to study conditions of the water fowl.

Dr. Whetmore, who is an assistant biologist of the United States biological survey, showed his visitors pieces of the flesh of ducks which had died this season and stated that the meat was in a soapy state. This indicated, he said, that alkali was in the flesh as animal oils and alkali form soap. Dr. Whetmore has several live ducks which he has inoculated with disease germs and they are in practically the same condition as the ducks affected by the malady which they had contracted themselves. He is studying the duck disease with a view to determining the cause and has made quite extensive experiments along this line.

The disease will affect the water fowl to a considerable extent this year, the scientist informed the Ogden people, and has commenced to develop to a slight extent already. Several ducks were seen which were affected by it and some which had died were also noticed.

Miss Holberg said that the section visited was fairly teeming with water fowl of all kinds. Sixteen separate varieties were seen, including Canadian geese, cormorants, teal, red heads, canvas back, pelicans, blue and white herons, glossy ibis, avocets, killdeer and many other snipe and larger species. In several places nests made by some of the smaller birds were seen which had been built up tier by tier for a distance of over a foot to keep the nests above the constantly rising water. The lake at this time of year, however, Miss Holberg said, was unusually low and water which had filled small inlets and marshes along the banks a few weeks ago had receded to the main lake, leaving bare stretches of alkali plains reaching for miles.

Dr. Whetmore has been investigating the duck malady for some time and has written a comprehensive report of the work which has been accomplished. He has been at his present location since early spring.

August 13, Friday.

Water gauge at 7:00 a.m. 3 ft. 7 $\frac{3}{4}$ inches. Very hot again today. This morning I wrote to R. N. Palmer of Pocatello, and for information regarding conditions among the ducks on the Portneuf reservoir at Marshfield. This letter was taken up early by John Davenport who hauled a load of carp up from the Bear River Club. These carps are taken to Jim Hull at Brigham for use in his fish hatchery.

Today I moved the water gauge from the wharf and placed it on a pile supporting the bridge at the laboratory. For there is little danger of shifting through heaving from the bottom. I have made a saw mark at the zero on the gauge, so cutting it into the pile support so that if all else the water gauge next season and this one is carried away I can place another at the same level. In this way the results obtained on the two years will be comparable. The gauge is on the south east pile on the east bank of the river.

The day was spent in making dissections and

studying the effect of
experience.

At present I am feeding
16 pounds of Barley & Wheat
mixed per day. This amount
costs \$1.00 and costs me
14 cents per pound or 20 cents.
I have about 250 lbs. in
hand.

Redhead	69
Yedwall	5
Coot	9
Greenwinged teal	7
Common "	2
Mallard	8
	100

There may be variation here
of one or two birds but not
enough to make any practical
difference. The great bulk
of these being young Redheads
they require more food. One
that I killed today had
gizzard and throat crampet.
This evening I ordered
100 lbs of Barley and 100 lbs of
wheat from W. F. Davis. I still
have 100 lbs of mixed grain in
cornmeal but wish to keep a
supply on hand. Mr. Davis
quoted me Barley at \$1.00 per 100
and wheat at \$.85 per bushel.

August 14 Saturday.

Water gauge at 7:00 A.M. $3\frac{1}{4}$ ft $7\frac{3}{4}$ in.
Cool and pleasant all day
with a strong breeze from the
southwest.

This morning we went up
the river and the launch
and then out Brown's Conflow
in a rowboat. The water
was very low in the conflow
and in several places the
boat scraped so that we
could barely pull over.

A dead Mallard, 1 still
and a muskrat were seen.
Graham Davenport who followed
us down captured a five thirds
grown mallard that was
fair and gave it to me. In
addition I found a Mallard
Drake dead from eating shot.
A post mortem on it follows.
I found that the water
in the bay which still has
gone down at least an
inch and perhaps more.
Great numbers of Mallards,
Pintails and Green-winged Teal
were present in the bay. I
could see west as far as
Mallard point. How much farther
down the water extended
I could not say.
I set a small water

gauge at the mouth of the
overflow. By getting occasional
readings on this I can
correlate the rise and fall
here with that of the river
at the laboratory. The gauge
was set with the water
level at 3 inches. The zero
of this gauge is at low water
not as high as on the
gauge at the laboratory.
I found that on the
plate here that alkali was
is raising rapidly on areas
not more than six inches above
the present water level. At the
in places at the edge of
the overflow the alkaline
efflorescence was raising as
a light fluffy mass similar
in texture to the alkali
deposit noted on the south
shore of Inland Lake in California.
An island or bar off
the mouth of Brown's overflow
200 yards or so had a
large amount of white
alkali showing on it.

A powder box full of the
scale was gathered just to
mouth of the overflow. The
efflorescence is not so thick
here as I have seen it
in other localities. The surface

Soil was roughened by
bird tracks too. Much when
the mud was first exposed
~~and~~ for this season more
mud & earth was scraped
up than is the case in
gatherings made at the
Laboratory and at the mouth
of $3\frac{1}{2}$.

There is considerable food
in the water of seeds &
insects held in this alkaline
efflorescence and it is
unquestionably this that
attracts the birds when the
surface is flooded.

The few Magpies found
affected may have secured
the poison through picking
up insects imbedded in
the alkali or by picking
off the dried flesh of dead
birds associated with it.
Both those seen were young
birds and young birds are
not particularly as to their
diet.

The gulls apparently are
cannary and after a few die
they then keep away from
the shallows. Numbers are
seen along the river now.
Many of those that were
not probed have

undoubtedly been seriously
affected and they learn to
avoid such things readily.
The California gull that was
used in experiment 23 rejected
instantly a bit of meat that
had fallen on the alkaline
efflorescence in front of the
laboratory. In manner
in which the pelicans were
poisoned is a mystery to me
yet unless it may be that
the young birds - they drank
quantities of the saline
water of Bear River Bay. Or
may have taken water from
the lake itself.

The carp had dug away
under one of the large out-
side racks at the duck pens
and this was filled in with
mud and then covered with
mud. The fish after they get
in seem anxious to get
out and begin to dig
on the inside of the racks
without bothering the
pens themselves. The fish force
their way in between the racks.
We have caught a dozen
a fifteen and have thrown
them out on shore and
since that there has
not been so much digging

The certain number of the
fish have become accustomed
to working under the pens
with these destroyed others
will not be nearly so
much troubled.

This evening I went
up to the Bear River Club.
I found that ~~the~~ ~~the~~ grain
for me had been forgotten.

August 15, Sunday.

Water Squage out 7:00 a.m.

3 ft 8 inches. It was cool and pleasant all day. During the forenoon I did various odd jobs and made nearly of writing about the tubaloy. Another 6x12 pen of inch mesh wire was completed this morning. I did not place it in the state as I have no catch to make. A man was supposed to bring me down 2 bundles but failed to do so.

The cost of this pen made of inch mesh wire was as follows.

36 ft. 4 ft. inch mesh wire.	144 sq ft @ $1\frac{1}{4}$ c.	1.88
48 " 3 ft. " " " "	144 " " @ 1 c	1.44
5 - 2x4 - 12 ft.	40 bd ft " 24 ⁰⁰	.96
5 1/2 - 1x4 - 12 ft.	22 " " 29 ⁰⁰	.64
1 lb. nails		.05
1 lb. Staples		.10
1 pr. hinges		.10
1 latch		.02
		\$ 5.11

Made of 2 inch mesh wire the cost for wire would be \$2.16 making total cost \$4.03

Two prices are shown for inch mesh wire above. The Ogden I paid $1\frac{1}{4}$ cents a foot and in Corning 1 cent. It is figured here at actual cost. The expenses of this pen was really somewhat

less part of the latter is
common. After dinner we searched
and returned 41 Redheads &
used the flat bands on their
birds. They feeding them
I picked the largest birds.
They have a short tarsus
with large joints and making
it a little more difficult to
adjust bands. Their bills with
the other ducks. They kept and
scratched vigorously when
handled.

Anders Hansen, Frank Hansen,
Si Knudsen, & Wald Hansen all
quicks here whom I met last
fall came down in an auto.
They said that late last
fall wagon loads of but
half came down stream and
that the ducks were eating
great quantities of it. This
material lodged largely in
eddies at the mouth of
channel 1 & 2. It was almost
impossible to drive the graminoid
deal away from it and shooting
was good. Without making
surely if it made any of
the birds sick & found that
that no sick birds were
noted late in the season
at all.

person who came down
with a load of groceries
said that the market for ducks
was poor last fall. So I
this I would send to indicate
few violations in shipping. Local
market hunters were forced to
peddle their ducks from
house to house in order to
dispose of them. Joe Cook told
me that the Duckworth Gun
Club had difficulty in selling
their birds.

At Sackett's the following
prices were paid to the market
hunters for ducks.

Mallards each \$1.12 1/2

Small ducks .07 1/2

When the birds were shipped
they sold as follows:

Mallards 1 per dozen \$1.50

Wintails 1.35

Teal (wildfowl bills) .90

I have prices agree with those
that I heard when here last year.

When peddled from house to
house the birds sold as follows:

Mallards per pair \$1.50

" common .45

Teal .35

In the coming I wrote to
the game Commissioner of
Alaska requesting a permit to

Collect birds for scientific
purposes in the state. I'll
go to San Mateo, Mexico
Calif. and stay in the south
some weeks from the south
then a magnificent lake.

I talked with James K. Anderson
on the afternoon of the evening.
He said that he had seen no
sick birds (except B. longirostris) in
the locality that I visited
last year.

Frank Bennett told me that
he had heard that recently
a few sick birds had been found
on the Delta of the Rio Grande.
There are some very small
M. t. about here. I have
collected two.

August 16, Monday
water gauge at 7:00 a.m.
3 ft. 7 ³/₄ inches.

Not during most of the
day. About 3 a heavy
cloud of dust advanced
from the south east showing
a brown obscurity in the
sky. Not until it was almost
upon us did the wind strike.
I closed door and windows
in the laboratory and stood
out for a few minutes to
watch it. First the dust
cloud obscured the willows

readily. The wind howled
through them making a great
noise so that one had
the impression of a storm
in progress much more terrible
than the one in progress.

With the first gusts (A hundred
and fifty swallows that had
been resting on the telephone
wires came out into the flats
in front of the laboratory and
hovered just above the ground
or settled in the short growth of
Salsomia scrub. Occasionally a
few rising higher up would
be caught and whirled away
but they soon shot down
just above the earth and
returned. The larger proportion of
these of course are young birds.
The entire day was spent
in making dissections & studies
of birds in the experimental
house.

In the evening I called on
Mr. Wheat at the Bear River Club.
It was very cool riding.

August 17, Tuesday.

Water level at 7:00 A.M. 3 ft. 9 in.

This morning I went out channel $3\frac{1}{2}$. Just before this channel passes out into the flats I found a large alkali barren ground with efflorescence. This lies about 14 inches above the present water level.

Just below where the profile was made I set a water gauge. At the high tide it registered 3 inches. Polanogiton has nearly all disappeared. We went today about nearly to Laughlin point without seeing any large amount.

The following sick birds were captured.

Gadwall "

Mallard "

Green-winged Teal "

Coot "

Pelican "

California Gull "

Two or three other pelicans were seen that were affected but no attempt was made to capture them. The two latter had the eye intensely irritated to which this may have come through feeding in salt water.

of the bay. These two birds
and the gulls were brought
in and laid on the grass
at the laboratory.

The few birds seen that
were affected may have become
so in water banked up by
the high wind of yesterday.
Except for the pelicans and
gulls the affliction was very
slight.

Mallards have suddenly
decreased in numbers but
Coots have as suddenly
appeared.

Beard Sandpipers, and a
number of lesser yellowlegs were
seen.

This afternoon at the
laboratory I saw Goldenrod
in bloom.

There is quite a noticeable
movement of migration among
small birds now mainly with the
yellow warblers.

August 18 Wednesday.

Water gauge at 7.00 A.M. 3 ft. 7 1/2
The river seems to be slowly
rising. It was cool and
pleasant nearly all day. I
spent the day at the
laboratory watching experiments
and making dissections.
In the morning I walked
up along the willows to my
boundary fence and found
quite a lot of goldenrod and
a number of subflowers in
bloom. I saw no migrants -
saw a dozen or more
yellow Warblers. Again after
lunch I went up and
collected a number of insects -
in both goldenrod and
subflowers. A mail bus was
convenient and I got on well.
In the morning I saw a peculiar
red bug but it eluded me.
Returning to the same plant at
noon I succeeded in capturing
it. A peculiar short heavy
bodied fly was lost. Two
Phymata sp. were captured. Thrips
were found on both goldenrod
and Helianthus.
I had an invitation from
some young people from Perry
town today and lost a

little valuable time. The first
time they brought a water gauge
which I was not bad-
3 1/2 Before now I went down
as far as the Ruby Crag
and loaded in small amount
of water in it. The boat
strapped badly in crossing
the bar at 1/2 the head of
3 1/2 above Buckets.

This afternoon Mr. Davis
sent me down a sack of
Barley and one of wheat. On
the morning I went up and
got them.

Barley 77 lbs at 10¢ \$ 7.77
Wheat 100 " \$ 85 per bu.

or \$ 1.42 per c. $\frac{1.42}{2} = \$ 2.19$

The grain was of good
quality. The cooks and I
them to prefer the wheat but
the Redheads take every of it.
Went on up to the Bear River
Club and called on Mr. Mead.
a scotch plumber Mr. Macmillan
a long time having for me and
another scotch long about the
vale of heaven. He told us
that the latter was a song
made up by the people of
that section concerning the
gun valley. The vale is made

from the Clyde up toward
the harbor and is a very
beautiful spot. Mr. Maxwell
has a wonderful voice and
the songs were well rendered.

The sunset this evening
was beautiful. Beyond the
mountains I was a deep
red glow as of a huge
fire while on this side
the promontory range stood
out a dark purple with
not a streak of lighter
color on this side of them.
The red on the opposite
side was confined to a
narrow space immediately
beyond the sun. Cool wind to turn later.

August 19, Thursday.
Water gauge at 7:00 A.M.
3 ft 6 1/2 inches. It was
very hot today and I
found it unbearable so in
South Bay. The light was so
strong that the light of
was forced to put on dark
glasses.

A small stream of water
was running out of the ~~the~~ ^{the} Canal
water gauge on 3 1/2 registered
35/8 inches. This slight rise
has made a great difference
in the amount of water.

was able to run much
farther down with the launch
than I have for some time.

& alts are raising in
profusion on the flats where
there is only 4 or 5 inches elevation
above present water level. Other
mud a little lower must
therefore contain considerable
concentration. All this will
be taken into solution later.

At the edge of a small
channel I dug a hole in the
mud with my hands. The
mud at a depth of 12 inches
yielded a considerable flow of
saline water.

In considering the affection
of a bird in newly hatched
Tareas it must be borne in
mind that a duck in feeding
comes large Breas. As the
water comes up it floats
little insects, seeds of *Polamogiton*
and other food, washing it up
in little windrows before the
advancing edge of the water. It
is these that attract the birds.
Just now I noticed that nearly
all the sick birds examined had
seeds of *Polamogiton* in the stomach.
These seeds lying in the scales
may absorb considerably alkali.

and convey it into the
stomach of the bird.
Only one such bird was
found today an immature
Mallard.

August 20, Friday.

Wet. Gauge at 7:08 A.M.
3 ft. $1\frac{1}{8}$ inches. This rapid rise
must indicate a break in any
irrigation canal somewhere. It
was cool and pleasant during
the early morning but hot
during the rest of the day.
There was little breeze. During
the afternoon I found it pleasant
outside the laboratory in the
shade. The thermometer every
morning stands at about
65° F.

I sent Bosley in to Corning
today for mail and some
gunny that I need. I will
build me more platform for a
pen.

Two experiments terminated
this forenoon Nos 38 + 39
These give post mortem results
very similar to those of sick
birds and I begin to feel
somewhat encouraged. + or two
or three days the outcome has
seemed uncertain. I spent the
entire day in working on these
birds and writing & in study.

Bosley returned about 6:30.
I found that I had quite a lot
of mail.

Blythe (Poisons their effects &

detection) says that (p. 127)
the neutral salts of the alkalis
are poisonous if administered
in sufficient doses. The poisonous
effect of the sulphate, chloride,
bromide, iodide, tartrate and
citrate appears to depend on
the specific action of the alkali
metal rather than on the acid or
halogen in combination.

In studying the analyses
of the scale of water from this
region I find the ~~the~~ three
following are the alkali metals
present

Calcium

Magnesium

Sodium

These are arranged here in
order of their abundance the least
common being first.

Blythe continues by saying
that common salt in such enormous
quantities as half a pound to
one pound has destroyed human
life. He concludes however that
the poisonous action of the
sodium salts is of scientific rather
than practical interest.

Here I may note that
the species affected in the main
are however fresh water swimming
forms and as such are

marcasitoid to these salts.

It has been found that the action of the salts of sodium upon the blood is to color it a brighter red while the form of the corpuscles is changed; they become shrivelled through loss of water.

Potassium salts are said to leave the body through the kidneys but appear to be excreted much more slowly than the sodium salts.

In the analyses of fluid the following present.

Magnesian sulphate - Epsom salts
Sodic sulphate - Glauber's salts.

The last named is present in large amount in the alkaline effluence sample from Sulphur Lake.

In cases of rapid change by sodic salts they will it is said be found in such quantity in the stomach that there will probably be no difficulty in coming to a direct conclusion by analysis. This however would be of little value in a bird's stomach. Their excretion is said to be very rapid.

August 21, Saturday.

Water gauge at 7:00 A.M.
ft. 2 ¹/₄ inches.

This morning I went out

Brown's Overflow. Found that a current was setting out of Brown into the river indicating a drop in the latter. There were a good many carp in the overflow. The water gauge registered $7\frac{3}{4}$ inches.

The raise in water has increased the moisture content of the drying soil of the flats so that much of the alkali crust has been moistened. On close scrutiny it is plainly visible however.

There were quite a large number of ducks on the bay, about as many as formerly I think.

On examining this area I find or seem to find a low area say of 5 inches in altitude in which the water may at present rise and fall safely. Above this is a danger zone.

This afternoon birds were placed in pen 12 for another experiment. Have terminated the experiments in progress but am retaining the present controls for a few days. The pens have all been prepared for ~~another~~ experiments but I will not start a new series as I expect to go into details this week.

Along the edge of Brown's
outflow in areas of mud,
newly laid very dense deposits
of a yellowish brown color. These
were found to contain the
same spindle shaped bodies
noted before in similar deposits
and many ^{other} living bodies. A
small amount was placed
in Bonini's pierce. formol. Much
effervescence took place at once
continuing for a minute. Most
of the deposit floated to the
top and sank only when shaken.
suspecting that this action was
due to the glacial acetic acid
present I placed a few drops
of the fresh acid on some
more of the mud. immediately
great effervescence took place with
a slight color of fresh mud.
or of a fresh marsh.

Boating on the water
surface was a scum that
had raised from the mud.
It was composed of a
least 7 parts of fine sand to
one of organic matter. It
was rich in several forms
of elliptical & rounded organisms
of a different form than the
spindles noted before. All was a
yellowish brown in color. none were
moving.

August 22, Sunday.

Water gauge at 7:00 A.M.

3 ft 4 3/4 inches.

Today it was warm though the sky was overcast much of the time. In the forenoon I walked up along the river to the Bear River Club crossed in a leaky boat and returned on the opposite side. Last night it was cold with a north wind and there was quite a fog & full in the air this morning. Small Empidonax were fairly common in the willows. I saw one or two Water Thrushes and several Pileolated Warblers.

At the Bear River Club I found a Barn Swallow's nest under the duckhouse containing young ready to leave. I caught two and banded them. The second flew out over the river and dropped in before reaching the opposite side. It paddled ashore easily but immediately an immature Night Heron that I had not seen before picked it up, held it a minute or so, dipping it in the water and squeezing it, and then swallowed it. I doubt if I need Chaves ever hears I had band.

I went down here largely from
to seed. There are a few plants
are now blossoming. Goldenrods
were common. I think that I
do not remember it from last
year. Foxtail grass is not
so bad as it has been.

Across the river I found
a great thicket of wild rose
growing 4 or 5 feet tall. The hips
were very large.

I have heard that the compass
plant closes its flowers as soon as
the sun gets high say by nine
thirty A.M. I do not know when
they open. The flowers are small
and yellow and I have been
watching them for ships but have
found none.

In the river I found a
Northern Phalarope with a broken
wing tip and brought it in
to the laboratory.

The remainder of the forenoon
and almost the entire afternoon were
spent in writing. Fred Hansen
and Es & artist were at the club.

Hansen goes in to Brigham tomorrow.
I mailed in the lot of photos
that I have here.

McMillan the plumber from
the Bear River Club was up in
the evening.

August 23, Monday.

This morning at 7:50 A.M.
the water gauge registered 3 feet $6\frac{1}{4}$
inches. Last night early it
was very cool with a strong
north wind. It was cool early
this morning with an overcast
sky, but in the flats the
heat was sultry and
oppressive.

Went out $3\frac{1}{2}$ this morning.
The river now has a better
current at this stage than
it had at first. I think
that the drawdown below have
cut out a little. It seemed
to me that I was able to
get much farther down than
usual also with the launch.
A slight current set out
the Neely Canal. No. 4 is bone
dry. Sackett tells me that part
of the old river channel has
been entirely dry so that the
mud in it has baked & cracked.
There are not so many
ducks now as there were two
weeks ago and I think that
they are leaving for other
territory because of shortage
in food. Mallards are less
numerous now but. Spoonbills
become more common.

There were numbers of least
Sandpiper and quite a few
Bairds on the flats as well
as numbers of Lesser Yellowlegs.
I collected a dozen of these
species for stomachs. I also
shot a female Spoonbill
and a male Mallard. The
Mallard seemed entirely normal.
Sometimes this walked normal.
The spoonbill had some disease
which caused necrotic growths
in the wall of the proventriculus.
The water gauge registered
3 $\frac{3}{4}$ inches.

Patches of alkaline efflorescence
were still forming far down on
the flats. I think that the
water is lower down here now
than before. A channel seems to
have opened toward the south
opening out into the bay.

The sick mallard was
captured but I believe that it
is afflicted with lead poisoning.
I captured a young Gadwall
and a green-winged Teal that
had injured its back in some
way so that it had no
control over its movements.
A few drops of rain fell
during the forenoon and the
sky was overcast all day.

Three & one half was simply
filled with camp.

In the afternoon I had
quite a number of birds
to care for and I wrote to
write. Made a trip in the
lunch to the Bear River Club
for a letter that had been
brought down for me and found
that it was a receipt for
grain purchased from V. F. Davis.
Yesterday we banded
and released twenty immature
Redwings. Very few of them have
left us at one time I counted
fifty birds left of which seemed
to be banded in the river
before this pens.

Some time ago Fred Hansen
& I set some traps for pelicans
on this flat. I found that
a Raven had been caught in
one of them. Coyote tracks
were all about but they had
not come near the traps.
These coyotes had been hunting
over the bay at least a mile
from the marshes.

The Geese have left the
flats and are now in
the grain fields up above
the game clubs.

August 24, ^{Tues.} ~~Monday~~.
Wells gauge at 7:00 A.M. 3 ft.
6 1/2 inches.

Was up at six this morning
packed up some specimens
etc to send in. Among them
an express box ~~filled~~ with some
samples of alkali scale and
water from the salt creek marsh.
A package of stomachs, one of
exposed film and two of salted
skins were forwarded by mail.

There were a number of
odds & ends about the
laboratory to be straightened out.
Permitted one experiment in
progress and returned the
controls that have been used
in the last series to the large
fresh water pens.

At five minutes of twelve
left for Corinne in the launch
with Bosley. Very hot going
up though this morning
early it was cold and
much like fall.

The water was very low
but there was not much
trouble in getting through.
Not many birds along the
river.

There were a good many
young Red heads in the
water and I saw two

branches of green winged Teal.
Isolated Warbler and a few
yellow Warblers were common
along through the willows
left Duckville at 11:55 and
arrived Corinne 2:30 P.M.

Got my mail but had
no word from R. W. Palmer
Pocatello who is my correspondent
in regard to sick ducks in
Idaho. I had come up
intending to go to Brigham
and then go up to Bancroft
Idaho tomorrow morning.
Decided to go on into Brigham
and wire Palmer for information.

Left Corinne at 3:43 arrived
Brigham 4:00 P.M. Registered
at the Booths Hotel.

Wire Palmer as follows

"Please wire my immediately
care Booths Hotel Brigham Utah
whether any sick birds Chestnutfield
if conditions warrant will go
Bancroft tomorrow. This
was sent officially.

Chased up had a
haircut and then supper.
Very good restaurant at the
Booths.

Aug. 25, Wednesday.

Up this morning at 2:30. Had telegram last night from R. H. Palmer as follows: "No. letter follows." My letter had been mailed in Portland last night. I should have expected it at 8 this morning but none came.

Last night I met James Knudsen on the street. He said that there were no sick birds below Brigham. Also met E. Knudsen and talked with him for some time. Met his brother at the Ford agency.

9:00 left for Ogden. Arrived at 10:00. Registered at the Marine Hotel. Had a gold inlay replaced in a tooth which required about 15 minutes. Then bought a pair of slender pliers for use in banding birds. Went to the Ogden State Bank. Deposited some checks and drew out some money. Did a little reading at the library and then had lunch. Mr. Bigelow was not at the bank. Left for Salt Lake at

1:00 arriving at 2:00. Everything
looks very dry along the
way.

Went at large to Mr. Chamber's
office. He said that he had
found no sign of sick birds
in the Essex Lake district.
He was anxious to learn
whether or not the water
there was not fitted for
the oyster industry. He
had a water sample and
some mud and wanted me
to take them for analysis.
I recommended that he send
them in to the Bureau of
fisheries.

I asked him in regard to
bird boxes. And he said
that he could not prohibit
them under the law. I
told him of one instance
in which a man had
shot 250 spoonbills from one
last fall. F. E. Herman from
a box set west of Esopus
Island. He wanted to know
the man's but this I
told him that I did not
think I could divulge as
I was in as good a guest
at the club. I could men-
tion him this instance as an

example of duck bagging.
He said this I told me
was going to make the club
accident for all their birds
if possible. The great trouble
there was in the fact that
sale of game is allowed.
If it were not for this
permissive practice there
would not be the incentive
to kill. Chambers asked
me if it was an
custom even if told
him no. The custom men
have the reputation of
being better sportsmen than
most of the local members.
Chambers will read the
paper that I suggested on
"Shall we permit the sale
of game" at the game wardens
Convention in San Francisco.
Warden J.C. Smith, address
Murray, they asked us
then go out in his car
and see the birds wet
on the marshes west of
town. We left at three &
returned about 6:30 driving
about forty miles. We
went west of Salt Lake
on 12th south street
passing the surplus canal

at the edge of town. This
was designed to carry
flood water from the Jordan
and so to protect the
low lying portion of Salt Lake
City. It carries a large
stream of water now with
the water low. Perhaps 3 to
2 as much as the main stream
of the Jordan.

Beyond here we came
to the New Moon Gun Club
grounds and stopped.
This was a long slough
with grass growing along
to the water's edge - no
flats about the water.
The water was slightly
alkaline. There were many
Mallards, Pintails & a few
green-winged & American ducks
there. Many Coots. No trace
of sick birds. This slough
continues on to the west
as McIntyre's Club.
The new moon club was
a barn like building. No
one living there now
leaving them we went
west nearly to Garfield
and had a good view
of the smelter smoke plume
across the tops of the

Agua Fria mountains. I with
said ~~that~~ since the appearance
of Bulletin 217 little has
been heard from Dr. Swains
804 theory.

Here we passed
White Lake and open body
of water with a good many
birds on it. Some of these
sloughs along here showed
numbers of ducks also.
Some of these are open to any
hunter.

From here we crossed
over to Peter's slough. This
showed a ~~scirpus~~ ~~of~~ ~~the~~
green marsh with dense
growth and an open
channel along the side.
The water had receded
here and though there was
steep 8 foot banks there
was no narrow edge
when in alkali scale
had raised. There were two
or three hundred green winged
Teal on this marsh. I
saw one bird that tried
to rise but could not.
It acted like a sick bird.
On the opening of what
was apparently a muskrat
burrow laid open by receding

water. I found feathers of
one that some animal had
eaten. Several spots of brown
white faeces were noticed
along the bank indicating
some trout. The water was
saline to taste and ran with
a swift current.

These sloughs through
here are fed by springs.
The country here was
level covered with salt
grass in places and with
considerable areas of greasewood
and a *Chrysothamnus*.

There are on other years
many other ponds, though
here that I now are entirely
dry. Ducks are much
more abundant than on
here. I attribute this to their
having been driven out about
by low water. Mr. Smith
says that fowling of Cat
he has noticed a considerable
flight to the south with
no return in the morning.
I wonder if there can be
an early migration on certain
the coast, still & many ducks
have gone somewhere.

We went out as far as
pleasant ground to reach
Peters.

Returning to the edge of
town at Redmond we saw
out again to Williams lake
a body of water with
many ducks near its center.
From here we went to
the Central Gun Club. There
was a frame building here
and there an old box car
that had been made into
a house. The water here is
in deep channels ~~at least~~
lined with rushes & sedges.
I saw one flock of geese
and a number of ducks.
Met Mr. Sam Williams
of Salt Lake City President of
the club and also Mr.
Finch & Mr. Rogers who were
out looking the grounds
over.

From here it is only a
short distance to Reddy
on the point where the
new State is just beyond.
Smith gave me the
list of clubs. Very about
a dozen in all but I lost it.
It says something as follows.
New State, Bergman's, Reddy's,
Halsey's, Central, Morris's,
Williams lake, Black Slough,
New Moon & McArthur's. The

Other I cannot recall.

No sick birds have
been reported down here this
year.

From here we returned
to Salt Lake and Mr.
Smith took train with me
at 7:45 & Page's.

Mr. Smith visited me to
tell Cook to make his sick
bird boxes 3 ft square & 3 1/2 ft
deep.

Returned to Ogden leaving
Salt Lake at 8:00 AM reaching
Ogden at 9:00 AM was very fortunate
to lose the field
claim that it was for Grants
nest.

Was very glad to visit
that low lying country below
Salt Lake valley.

Wrote until 12:45.

August 26, Thursday.

Was called this morning at
6:00 AM, ate breakfast and had
a horse & buggy brought
around at 6:45 AM. Drove
west to Blm Belgrade in
West Hooper and from there
visited the mouth of the
Webb. It was cool
and pleasant in the morning
but toward noon became

very hot.

There were great growths
of skunk weed & fleecy
growing along the roadside.
Most of the plants had
purple flowers but in a
few places I saw a few
plants of a yellow-flowered
species. I think should be
attractive to insects. I saw
many bees on them but had
no time to collect. A few
birds - Yellowthroat, a small
flycatcher - (Traill's) & a
few Pileolated Warblers were
attracted by these insects.

The entire country here
was very dry and showed
the effects of the long dry
season. At Eggen no
water was passing the
dam of the Willamette all being
diverted into the canal.

Brewer's Blackbirds &
Meadowlarks, with a few Brewer's
Sparrows were the common
species of birds seen.

I stopped & talked for
a minute with John S. Wetland.
He says that this year the
sugar content of the beets
is low. This is attributed
to the fact that the dry

season caused the birds to
migrate early before all the
migrating birds had reached the
factory planned to start about
September 10.

Will Bulmer, foreman of
his horses, having a rig
just we went on down below
to the mouth of the river.
In the south channel
was a pool less than a
quarter of a mile long that
was fed by overflow from
his Artesian wells. Except
the channel was entirely dry
and that toward the
lake when it was deeper
there is a large amount
The North Channel in its
upper portion is deep and was
filled with water. Below it
was entirely dry.

The entire stretch where the
channel formerly spread out on
the flats was entirely dry
the ground being caked & hard
so that the water in the
channel stops $1\frac{1}{4}$ to $1\frac{1}{2}$ miles
east of the Club house. Beyond
here was one slight pool marking
the site of the area where
I found so many dead
birds last year.

Toward The Lake

At this point Saline encrustation began. The ground was split into blocks more or less square or round. The efflorescence appeared in the centers of these blocks instead of along the cracks. Toward the lake this encrustation gradually increased until it was a heavy crust of salt & soda 1/2 to 1 1/2 inch thick left by the evaporating lake water with moist earth beneath. The lake has receded a mile or more half here and probably more. I saw one bird that may have been a sick quail. There were a few ducks where there was water but no sick birds were noted.

Three mountain plovers were seen. Quite a number of ducks were seen on the upland in ponds.

This country has evidently been dry for at least a month and the birds have been ~~left~~ driven out entirely. Mr. Belnap told me that when his grandfather came in 1862 that the lake was far down. A steep banked channel

extended far down past the
present delta. Later the lake
came up until the steamer
City of Corning ran up the Weber
to a point beyond Belnap's place
and still very rapidly.

From what I have seen
in the past week I am
convinced that more than one
third of the ducks that are
ordinarily ~~inhabited~~ ^{inhabited} ~~inhabited~~
inhabitants of the lake part
have been forced to leave. Part
of them have gone into the
upland water. Others must have
been driven to make early
migrations.

Had dinner at Belnap's
and then drove into Ogden
reaching there at 4 P.M.
Left my gun (collecting just)
at Crofting's to have it
fixed. Went to the hotel
and cleaned up. Wrote a
few notes before supper.

Met Mr. Bestwick son
Insecticide & Fungicide inspector.
There are quite a number of
farm management men here. They
do not seem to injure themselves
with work.

Saw Mr. Bigelow in the
evening. & after dinner he

and Mrs. Bigelow took me
up Ogden Canyon to Miss Kiesel's
Returned to Ogden at 10
Wrote until 11:15 & turned in.

August 27, Friday.

This morning after purchasing
some Sodis & Magnesia sulphate
and getting my collecting fishot
at Brownings I went to the
station. Had not success in
raising the gun club at Duckville
until I was about to leave
the hotel.

Left Ogden at 9:20 changed
at Brigham and arrived at
Corinne at 10:27. Went to the
post-office for mail and then
at the hotel finished a report
on experimental work of the
first part of August. Started
by letter I to H.S. Fisher finishing
it after dinner.

Booby came at one had
dinner and then we left
for down the river about three.
Secured the remainder of the
grain due me at Ferry.

The river has raised a
little so did not have much
trouble. Arrived Duckville at
5:45.

Found things at the laboratory

in very good shape. Bosby
had made another platform
during my absence and all
experiment pens were ready
for new experiments.

Wrote for a while in the evening
and then went to bed.

August 28, Saturday.

Water gauge at 7:00 a. m.
3 ft. 3 $\frac{1}{4}$ inches. Very hot and
close all day.

Worked during the early
forenoon at banding birds
and placing them in experiment
pens. Installed birds in 7 pens.
One experiment was begun
and birds prepared for six
others. It is my ~~plan~~ custom
to place birds in the pens for
twenty-four hours with good
food and water in most cases
to ~~avoid~~ accustom them to their
surroundings.

Following are water gauge
readings during my absence.

Aug. 25	3 ft 4 $\frac{3}{4}$ in.
" 26	3 ft. 3 $\frac{1}{2}$ "
" 27	3 ft. 4 "

Water gauge on Channel 3 $\frac{1}{2}$

Aug. 26 5 inches

Water gauge on Brown's overflow
Aug. 25 5 $\frac{1}{2}$ inches.

Was busy at laboratory
all afternoon.

August 29, Sunday.

Water gauge at 7:00 a.m. 3 ft. 2 1/8 in.
Began experiments in the
six remaining pens in which
birds were placed yesterday this
morning. which occupied us until
10 a.m. cleaned up the
laboratory a little and
dissected a very large Mallard
that had died in pen # 1.

The death of this bird
occurred very suddenly yesterday
afternoon. Bosley was working
about the pens and noticed
that the bird was apparently
doing well. Five minutes later
it was dead. Death was
due to heart poisoning (see post mortem)
This bird had a very
large muscular heart. In the
hurry I neglected to measure it.

Cleaned up the laboratory then
and changed clothes. About
11:30 Mr & Mrs Bigelow & Miss
Kiesel came down in a car.

Showed them the laboratory and
the ducks pens and explained
to them somewhat of the methods
of work. They left at 3:00 P.M.

Mr. Belknap of Hooper arrived
about 2:30 in another car and
will remain for a day or two
Showed him the sights around

The laboratory and the
duck pens.

In the evening I went
down the river as far No. 4. I
found ~~as slight~~ ~~cease~~ water in
the head of four but no current.
Since the rise in the water the
river runs much more swiftly.

The duck pens in the river
are getting dirty and I will
be glad of this raise to
wash them out.

I believe that some of the
irrigating water has been
turned back. Accounting for
this raise now.

No 1 has raised considerably
and at times a slight current
set out the channel.

Bright moonlight tonight.
Many ducks are flying. There
were a few birds.

August 30. Monday.

Water Gauge at 7:00 a.m.

3 ft. 2 in. for.

Was up at 6:30 and made
the rounds of the experiment pens.
Hazy and overcast in the
morning with a dim haze
obscuring the mountains all
day. Not uncomfortably warm.
In the afternoon a strong
south breeze sprang up.
After breakfast Bosby and
I took Mr. Belnap with us
down to Clanghies Island.
Returned about 3:30.

The river has a noticeably
swift current since this
last raise and is carrying much
silt. The current was very
swift low down in 3 1/2. A
fair stream of water was
flowing out the Neely Canal.

On 3 1/2 we drove in a
six foot post into the mud
and moved the water gauge
to it nailing it fast. The water
washes the pencil marks on
these gauges badly so that in
reality they should be painted
white and marked in black.
However these will do for this
season.

The gauge here registered
3 feet 2 inches. 3 3/4 inches.

The slight raise of water
has flooded considerably areas
on the flats that were not
covered before. Another 4 or 5
inches will cover a great deal
more.

We found the following
sick birds:

Green-winged Teal	5
Pintail	5
Mallard	1
Coot	1
	12.

Besides these two dead
Mallards and a dead coot
were seen.

There were large numbers
of birds on the flats and
birds extended to the south
when I was on Slaughter
Island as far down as I could
see. There was a continuous
band of birds from the west
char around south in the
bay and up the east side
to the head of 3 1/2. Considerable
water has spread east of
mud point again.

I think that most of
the birds brought in would
have recovered on the flats
as there is a good supply
of water across them now.
One Pintail was unable

To hold its head up but the
others were in better shape.
No birds were found in the
weed growth. Timing the upper
course at $3\frac{1}{2}$ but all were
in the water lower down.

Water was deep enough
to run a boat through
the center of the bay down to
Langley Island without
much trouble. There is a
great bar on the east side
ground of Davis Island and
I could not get in there.

Shallows extend in toward
Langley point but much
mud was exposed near it.

To the west of Langley
Island a band of mud
showed along the rushes
as far as I could see.

Langley Island was
connected with the main island
by a broad mud bar.

The taller *Cyperus* on the
island was all entirely dead.

Near the water edge and in
patches elsewhere new growth
was springing up but all
looked rather sickly and
I doubt if it makes a
successful growth. On the
south shore the root bulbs

are beginning to wash out.
Leaving the bar mud.

There was very little tall
growth remaining on the entire
island. The muskrats appear
to have deserted their house.

I was surprised to find
Savanna Sparrows here.

Avocet very abundant and
I noted great flocks of Northern
Phalarope and Western sandpiper.

Reached the clubhouse
again about 3:30 and spent
the remainder of the afternoon
in caring for the birds.

Set the new 6x12 pen in
the water and gave it No. 15.
It will be used for very weak
birds to keep the others from
trampling them. Tried the
experiment of administering
water to these very sick birds
by means of a glass funnel
and found that with care it
worked very well. The point
of the funnel is inserted down
the throat as far as can be.
The head is held tilted up but
with the neck drawn in. Two
teaspoonful of water approximately
are poured in and then the
head raised to straighten the
neck. This is repeated three
times.

Had quite a talk with Mr. B. in the evening in regard to the game laws. He told me that at the South Pacific eating house office in Agaña that they got four dollars a deer for Mallards. One dollar for mixed ducks 1.75 for geese to \$2.50 for teal. With Mallards at that price. This is money in shooting them when the hunter is allowed only 25.

Had a "show" in the evening by Joe Cook.

August 31, Tuesday.

Water gauge at 7:00 a.m.
3 ft 2 1/4 inches.

Went up the river and out Brown's bluff this morning. There was a good head of water in this bend of North Bay and a great many ducks were present. No sign of sick birds were seen.

The water gauge on Brown's read 7 1/2 inches. It set in a heavy post here, driving it nearly thru. put in the wind and nailed the gauge to it. A new gauge with heavy pencil marks was used. These marks wash off unless very heavy or else become obscured by silt in the water.

I crossed to the island
off the mouth of Brown's river.
Ordinary conditions, this is a
bar. I found a great
area of dried Potamogeton
above which was a
large extent of alkali efflorescence.
High water has had little
effect here.

Visited Knudsen's Club on
returning. These main buildings
here are well built and are in
very good shape, though many
of the outbuildings are tumble down.
It is strange that this place
does not burn during the
frequent fires that sweep across
the flats.

~~No trace of the~~ *Myotis*
so abundant here last year though
I saw one pile of bat excrement.
These bats are frequent about the
buildings in Deschville usually.
in pairs. I found two hanging
between two journals that were
nested together, others in corners
of a screen door or under the
rafters of the barn. These pairs are
not necessarily male & female.
both may be males.

In one of the outbuildings were
great numbers of mud wasp nests.
These along the gable covered
entirely a strip more than

a foot wide and six teen feet
long. In places new nests had
been placed upon old ones. Patches
on the walls covering two square
feet wholly were not mended in.

In the afternoon and
evening I prepared my monthly
expense account and
accompanying reports. The
amount for July was
\$181.22

1915

September 1, Wednesday.

This morning I finished up some oddies and ends at the laboratory, made some dissections etc.

Water gauge at 7:00 a. m. 3 ft. 2 $\frac{1}{4}$ in.

About 10 left for Corinne

In Corinne I had dinner with Bosley at the hotel and then certified to my August expenses at the post office.

Also called on B. M. Shaw at the lumber yard and made out a Form 5 for lumber that had been used from time to time. amount \$4.90

A severe rain came up at 5:00 just as we were preparing to leave Corinne. We took refuge in a covered boat belonging to Will Bosley but the roof leaked and our was soaked. Finally left Corinne at six and came down the river.

For one half the distance we skirted the edge of a heavy storm to the south. The air was filled with a fine mist and we were drenched. This happened on every southward trip of the bender. On the return each time we dried off. The alternate wetting and

and consequent evaporation
drew so much heat from my
body that I got rather cold.
On arriving at Rockville, ^{MS}
found that it had barely sprinkled.
A heavy storm in the
evening up the Bear River Canyon.
This should raise the river.
Very chilly here.

September 2, Thursday
Water Gauge at 7:00 A. M.
3 ft. 3 inches.

The morning was cool
but with threatening clouds
to the south west East.

I spent the day in the
laboratory getting caught up
with routine work, straightening
out notes and working on
the experiments in progress.

Many Pileolated Warblers were
in the willows and I saw
several Wood Pewees.

About eleven a heavy
storm passed across south
and then east and then
came back from the north.
A beating rain continued
until five in the afternoon.
Small pools covered the flats
at the laboratory almost at once
and in an hour a little
stream draining from them was
running along in front of
the experimental pens and
past the laboratory. I found
to my disgust that my
roof leaks in two or three
places and I had to watch
my papers to avoid having them
ruined.

The air was intensely
damp at once in contrast to

The dryness of the past few months. The floor of the laboratory impregnated with salts brought in from the flats in front on our spore immediately absorbed moisture and the boards were wet as though they had been washed. Books became damp and and the covers warped, guns drew moisture and even my clothing was moist. I will put in a stove as soon as possible in order to counteract this.

A climate like this is very hard on lumber. The laboratory now shows the effects of the alternate drying and expanding already without the paint that I put on it would have been in bad shape.

Immediately when the rain slackened in the evening I set an experiment fire over a pot on the open barrens in front of the laboratory and placed some birds in it. Next Bosley got three pails of the water draining from the flats also. This was intensely saline to the taste. I were thunder & lightning came with storm

September 3 Friday

Water gauge at 7:00 A.M. 3 ft. 2 1/2 in.

This morning it was cold and very thing was wet and muddy. The sky was obscured until 9:30 with light sprinkles of rain. Then the sun came out and because of the humidity for a time it was intensely hot. A severe storm passed from Bear River canyon down over Brigham, Ogden and Salt Lake City.

The entire region to the southeast was obscured.

I went out 5 1/2 in the canal. a fair stream of water was running out the Neely canal. I found that the water gauge at 3 1/2 registered 5 1/2 inches.

Pools of water stood about on the flats every where. The alkaline efflorescence had entirely disappeared being taken into solution again. Part of it has without doubt been washed off but the main amount is held in the surface soils.

Two pintails and one wigeon a beautiful male was found sick and was brought in.

In the afternoon six Redbacks and four Coots were banded and released.

[The text on this page is extremely faint and illegible due to fading or bleed-through from the reverse side. It appears to be a continuous handwritten paragraph.]

September 4, Saturday.

Water gauge at 7:00 A.M. $3\frac{1}{8}$ " inch.
This is the water that fell
the second and third that is
causing this rise now.

Clear all day today.

Went out Brown's Overflow
in the forenoon. The water there
is showing a good current
down and a considerable
amount has reached the bay.
The gauge registered $8\frac{1}{8}$ inches.

Water running back into east
bay has covered moderate areas
of dead Potamogeton. Cracks extending
through areas still dry back
of this contain water that is
strongly saline.

Halophilous plants or plants
that are salt enduring have
covered areas above this that
last year were moist mead.

The alkali encrustations lower
down toward the mouth of
the overflow have not been found
as yet. Pools in the barrens were
strongly saline.

Birds however are contenting
themselves with feeding in the
fresh water of the open bay.
There were no birds in East
Bay nor did any of the pools
~~below~~ on the flats have fresh
bird tracks about them.

No sick birds were seen at all.

The laboratory floor & parts of the walls are still damp today. I had Boshy cut up some dry willows cut when we cleared the river bank for a boat landing. These have laid here all summer and will make good wood. Boshy will go to Corvum tomorrow and I will bring back a small stove that he has there.

September 5, Sunday.

Wet gauge at 7:00 A.M. - 2 feet 11 inches.

There was a very heavy dew this morning from the recent precipitation and subsequent evaporation no doubt. I walked up along the willows and had to wear hip boots to keep dry.

There were many Picolated Warblers in the willows with a sprinkling of Ruby-crowned Kinglets Audubon's and Mc Gillivray's Warblers Western Wood Pewees also were fairly common. In the afternoon some juncos passed the laboratory.

The remainder of the day was spent at the

Laboratory.

Alkalies are being to encrust
on the flats here at the
laboratory again. It was
sharp and cool in the
evening. Received quite a
bit of mail when Bosley
returned from Conine.

The number of small birds
in the willows was much
in contrast to what it has
been all summer. I saw
one or two very few feet.

These willows form a dense
cover and it is difficult to
identify small birds among
them.

September 6, Monday.

Water gauge at 7:00 A.M. up 10 1/4 inches.
Cool and pleasant this morning.
Until 8 the sky was overcast
but later it cleared and was
warm and pleasant.

A wind out 5 1/2 and
rowed down the middle
of the bay to a point even with
C. Langhite Island without
difficulty.

A strong current was
setting but the Harbor boat
and the old row boat must
be pulled again. The water gauge
here on B 1/2 registered 17 1/2 inches.

Strong wind channels were
flooded and large pieces on
the bay were covered with
water. Water extended far east
of mud point Feb. 3. A strong
south wind pulled back the
water back.

Thousands of ducks were
banked up on the flats. They
were higher up than on
my last visit apparently
following the water back. Very
many sick birds were seen.

Two Green-winged Teal and
a Pintail were captured each
after a hard chase. This water
down here is so fresh that

They would have recovered
without any doubt. The actual
affection cannot I conceive take
place in these great areas that
now are flooded with fresh
water. The birds get the poison
higher up and the focking with
the things low down become
paralyzed and are unable to
leave. I left him at present they
would recover but in stagnating
water they would die. ~~It~~

Only one dead bird was
seen today that was fresh and
as sick as ever & was not
high up on the overflow.

The higher flats have even
still not seen the rain of
September 11 due to their saline
circumstances. Much of the lower
portions have been washed clean
by the rain so that in flooding
little will remain to be taken
into solution which will be
much better for the birds.

I found one great flock of
Mountain Loons close and not
seen in two spots.

Miss Harvey & I, Red & James
Dick Rogers, Malcolms Taylor, Cincov,
and Mr. Joe Finch of Health came
down this afternoon. The first
five are officers of the club.

Mr. Harry Finch is president.
They were out in the mud boats
in the afternoon.

In the evening they were
at the laboratory for an
hour and a half.

They reported that four sets
ducks were seen Jan. 19th on
the bay.

The raise in the river has
flooded the duck pens and
we moved all of them this
afternoon and reset the racks
that keep out the carp.

Sunday evening I caught
nearly a dozen carp of a
pound weight each in the
racks.

September 7, Tuesday.

Water gauge at 7:00 a.m. 2 ft 11 in.
This shows a slight drop
for some reason. The water should
continue to rise or at least hold
its own now. The butts will
need no more irrigation but
with the heavy rains this
should not require so much
water.

I went up the river and
out Brown's overflow this morning.
It was cool and pleasant
travelling. These are typical
fall mornings with enough chill
in the air to make the sun-
ful pleasant. Yesterday a
storm passed across the hills
Wabash and afterwards I
almost expected to see snow on
their summit.

Dew was not so heavy this
morning.

The stronger current in the
river is very noticeable in running
the launch. A strong stream
was running out Brown's overflow.
The water gauge registered $30\frac{7}{8}$ in.

There was much more water
in the East Bay than on my last
visit. About 165 gulls
Larus californicus, delawarensis & franklini
were walking about here in

The shallows picking. This part of the bay has been by all summer and great cracks have formed in the ground. With the incoming water myriads of Carabids and spiders have been drowned out and the gulls even capturing these. Most of them picked them from the surface or occasionally felt about with the ^{beak} ~~bill~~ ^{beak} immersed. One bird ^{was} observed to stand ~~stood~~ in one place treading with its feet ~~down~~ ^{down} jamming up the bottom deposits and picking out anything desirable as food. They were seen drinking and bathing. Occasionally one lifted up moss from the bottom and examined it.

A great area here between the ^{moss} ~~the~~ alkali barren and the ^{grown} ~~the~~ bottom of the bay represents an area that last year was mud over which the water alternately flowed and receded. Now it is grown thickly with lambquarters and a few other scattering plants. This indicates considerably freshening of the soil.

Strong alkalis were present on the surface mud

under the dry Potamogeton in
areas not yet flooded.
Cracks surrounding these were
filled with water. Saline to taste.
The deeper water in the bay
had a peculiar alkaline taste but
little salt. The water in
the extreme shallows was
very salt.

Water had come up to
some extent in the bay west of
Brown's. Ducks were confined to
the main bay still. I saw
very few in the newly flooded
areas.

No sick birds were observed.
On coming down the overflow
hollow in two places I flushed
green-winged Teal from underneath
the willows. These birds flew
off low over the water and all
without quivering birds that are
becoming affected.

I found a brownish scum
on certain pools apparently
an alga. I brought some in
for examination. A grey scum
was observed washed in from
the main bay & samples of
it were collected.

The evening was beautiful.
A few mosquitoes are out
since the rain.

September 8, Wednesday.

Water gauge at 7:00 A.M.

2 ft 10 $\frac{1}{2}$ inches.

This morning was cool and sharp. at 7:00 the thermometer in the clubhouse stood at 52° and about 10 it had climbed to 58°.

The mountains stood out clear and distinct. Every gulch in Willard Mountain rises plain while to the south were little mountains, Antelope Island and beyond the Ogish range. The smoke from the Garfield smelter was plainly visible as the morning progressed this spread from a single column into a broad band obscuring the valley to the east.

Local valley region was clear and to the westward the Unagin mountains beyond Fremont Island. And from Fremont Island was visible from the doorway of the Laboratory. Now however I noted that growth on Black willows blocking Overflow #1 had been sufficient to cut off this part of my view. During the forenoon I worked on my notes for a

short time. ~~and~~ three experiments
were terminated and Bosby
prepared the pens for a
new set.

The goose brought in
August 30, now eats from my
hand without fear but does
not like to be touched. It
walks outside the door of
the pen and when alarmed
turns around and goes back.

One immature Drake Mallard
has suddenly become very tame.
This noon it walked outside
at. out of my hand and even
climbed onto my lap for
grain. After a few mouthfuls
it would go hurriedly back
into the pen for a drink
and then return.

In the morning early I
set up the stove. One window
pane at the top of a window
was removed and a piece of
galvanized iron with a round
hole cut in it was substituted.
A stove pipe was thrust
through this and through
a hole cut in the screen.
The screen was allowed to
lap over all around the pipe
so that it can be bound
down to keep out insects.
I will have to purchase two

more lengths of pipe and an
elbow to throw the stove pipe
up over the roof.

Bosby cut up more willows
during the afternoon.

I took several pictures
in the afternoon and worked
on my notes until 6:30. Had
Mrs. Sackett & three youngsters
as visitors.

I started the stove in the
evening and found that it
drew very well except with
the pipe point straight out.
The willows are excellent
wood for my purpose.
They burn quickly. All that
I desire is sufficient heat
to warm the room and
keep it dry. As always in
first starting a stove there
was much smoke from
oil on the pipe etc;

September 9, Thursday

Water gauge at 7:00 A.M. $2\text{ ft } 6\frac{3}{4}\text{ in.}$
Irrigation water must have been
turned in to account for this rise.
The duck pens are flooding out.
Again and tomorrow it will
be necessary to move them again.
A launch passing yesterday
washed down two of the racks.

The thermometer at 7 this morning stood at $50^{\circ}+$ and the wind had a bite in it that almost made me hunt up a coat.

The mountains were more hazy today.

I went out $3\frac{1}{2}$ this morning and ran down more than half a mile below where it ~~of~~ comes to the flats without any difficulty.

The water gauge registered $8\frac{1}{2}$ inches. It seems a little strange that Brown's overflow should rise faster than $3\frac{1}{2}$ but this is probably due to the fact that the other overflows and various side channels absorb much of the current.

There were myriads of ducks down here, mainly Green-winged Teal & Pintails with many Spoonbills and Mallards. Birds are more numerous than a week ago and are evidently returning now that the water is again covering the bays.

Three sick birds only were seen and captured. The water anywhere here on the flats is fresh enough so that they may recover and this is the explanation.

of why there are not more
sick birds. Many are affected
but few become seriously
disabled. With so much
new territory flooded there is
more inducement too to feed
in the areas where the sand
is softer.

Returning I crossed over
to No 3 and went down to
the flats again. A good current
was flowing here but the
ground was not yet covered
water being confined to the
flats. There was some water
between #2 and #3 but not
much. Filling the east
end of the bay will require
some time. There is a
good current out #1 & 2 now
and some water out #4.

In the afternoon I worked
at the laboratory and made
some dissections on a fresh
Eusmateria jamaicensis, distributed
these new experiments.

John Davenport will go
in to Perry tomorrow about
six I took some letters up to
him.

September 10, Friday.

Water gauge at 7:00 a.m. 2 ft. $5\frac{1}{2}$ inches.
Wind was cold and sharp this morning.

Went up the river and out Brown's overflow. I was able to go and down clear to the mouth of the overflow in the launch without trouble and found a strong current setting out into North Bay.

Water gauge Brown's 1 ft 1 inch.
In the east bay water has flowed back farther than on my previous visit. Wind had blown the water out across the flats and then it had receded leaving an area of soft mud. I counted many Gulls, California Ring-billed & Franklin's and a few Black-bellied Plover were feeding on this.

Along this newly flooded area I found that the water connected with the main sheet in the bay was fairly fresh. Where seepage had come up in little tracks, cracks or large areas it was sure to be intensely salt due to the alkalis taken into solution.

We rowed out across the bay to the island at the mouth of Brown and

found deep water all the
freshwater. Many ducks were
feeding in the shallows all
along. No sick birds were seen
at all nor do I expect many
with so much fresh water here.

During June and July sick
birds found were all encountered
here on Brown's. Now they are
all far down on South Bay.

I sometimes think that in
this Duck malady that there is
a possibility of two factors in
operation. At Brown's lake it is
almost certainly an alkali that
is killing the birds. Here on Bear
River the possible presence of
a ptomaine (but?) obstructs itself
but is immediately suppressed
by many facts. A protozoan
also might seem plausible
and as such might be carried in
feces to Inland lake. It would
of necessity seem to be a form
peculiar to alkaline water &
incapable of sustaining itself
in fresh water. There are ~~so~~
many improbabilities about this
too. Whichever I turn I am
forced back to my original
hypothesis of alkali poisoning
and that in spite of the fact that
my experiments as yet are
rather unsatisfactory.

By the afternoon a strong wind came up from the south blowing 35 or 40 miles an hour.

I took the launch and went out No. 2 to see what the water conditions. At the mouth now. But the right hand fork I found little of importance. The flats were entirely dry.

Returning and going out the left hand fork I was stopped by shallow water almost at once and proceeded in foot.

There was some water in Pintail neck and East Pass and with the heavy wind this was being driven up across the flats at the rate of two feet to the minute. In the average it pushed along running onto and filling up cracks and depressions until the ground began and then I ~~was~~ prepared to further experiment immediately at this edge was a scene of chaos that was filled with *Staphylinids*, *Crabids*, *Dermaptera* & *Aphididae* with many kinds of *Potamogeton*. Insects ran hastily in front of the impending flood or overwhelmed struggled in the water behind the crest.

The surface here was covered
with an alkaline efflorescence
and this was largely taken
into solution at once. The
front of the incoming water
where food was most abundant
was therefore strongly impregnated
with these salts as was the
foam.

Many Pintails and teal
were hastening in to this feast
and gulls were already present.
The ducks were loth to leave
and hesitated before beating up
against the wind.

I returned to the laboratory
for some pails & jars and
returned with Bosley. He
stood in the front end of the
launch and in going down
two the waves washed in
so heavily that we had to stop
and bail out the front bulkhead
to avoid swamping.

We gathered two pails
of the alkali water and thus
two quart jars of foam.

We had to move the
duck pens in the river again.

The heavy wind continued until
after dark. I attempted to light
a fire in the laboratory but it
smoked so that I had to put
it out.

Sept 11 Saturday.

Water gauge 7.00 A.M. 2 ft 6 1/2 in.

The high wind continued throughout the night from the south and sometime before daylight ~~below~~ up a light rain. This increased until about ten it was quite heavy and made pools on the flats.

The wind was so strong that there was little use in going out anywhere.

The laboratory was very damp and because of the south wind it was not practicable to light a fire - about 10 A.M.

Went up to the Bear River Club and borrowed a stove pipe elbow. With this I was able to put the pipe straight up and soon had a fire. In a little more than an hour the place was nearly dry again.

I had some trouble in starting the motor as water had gotten in to the spark plug.

Light rains continued until noon and then saw for a sprinkle or two. The afternoon was dry though the wind still continued. At dusk the wind shifted north and it was very chilly.

I shot a Townsend's Solitaire

at the laboratory in the morning
and in the afternoon a sparrow
shot in the willows proved to be
Melospiza pincolni.

Worked on notes and experiments
all day.

September 12, Sunday.

Water gauge at 7:00 a.m. 2 ft. 6 $\frac{3}{4}$ in.
It was cold and windy
early with a storm threatening. A
heavy storm cloud covered Willard
Mountain. When it lifted I saw
traces of snow on the higher points.
To the south the air was clear
and both the Quinich and Quagin
mountains were visible. By ten
the air had cleared and it was
a fine cool fall day.

Went out 3 $\frac{1}{2}$ this morning
and ran down the channel
past Mud Point with the launch.
Had some trouble in starting this
morning as the spark plug was
filled with carbon.

The bay from Bigelow Point
down now contains about
the amount of water that it
did last fall and all is fresh
and good. The water extends
clear to Slaughter Point and we
rowed over there without
difficulty. On this island grown
with S. cypripedium here we searched
carefully for sick birds but found
only one a Green-winged Teal.
I saw where Coyotes had eaten
half a dozen others. Fresh coyote
tracks made in the mud last
night were seen.

Thousands of ducks were ~~seen~~

spread out in the way and
many were very tame. I walked
past. Teal and Spoonbills within
gun range. Birds were flying
back and forth continually and
I sat half an hour in a blind
watching them.

With so much fresh water
there is little chance for sick
birds to get down disabled unless
badly affected. One male Pintail
was found in the middle of
the bay that was helpless and
a dead Mallard drake was seen.

Coming back the shot ~~came~~
on the launch came loose behind
the propeller and we had to raise
the stern into the rowboat and
fasten it in place with a nail.

The current in the channels
and in the river is exceedingly
swift now.

I spent the afternoon at the
laboratory in watching some
experiments and in writing
up notes.

September 13, Monday

Water gauge at 7:00 A.M. 2 ft 5 1/4 in.
Very cold and sharp this morning
Cold all day. Partly cloudy with
light showers. Thermometer at 7:00 P.M. -
73°+.

After breakfast we moved
down No. 2 to its mouth.
Half a dozen Mallards & two
Redheads were seen in the channel.
One sick Pintail was captured.

Water was flowing out No
2 and there was a fair
amount in the flats. Water
extended down the center of
East Pass to a point below
Seal Pass. and westwards it
reached to the mouth of #1.

I walked across and searched
around of the rush islands at
the mouth of No 2 but found no
sick birds. There were no
ducks in here save for a few
Pintails at the ~~mouth~~ end of
the water in East Pass. a good
many birds were gathered at the
mouth of #1.

Bayless island was still
dry.

Water was running in here
rapidly and the ground
was soaking up as it came
so that the mud was soft
as ever. When it had dried

and cracked the surface was
covered with an alkaline efflorescence.
Water in cracks was strongly
saline.

From here I walked down
through Seal Pass and found
it entirely dry. clay though
with the ground hard and
cracked. Dry ground extended
to the north as far as snailpoint
and then the water swung in as
the point swung to the east.

At the mouth of Seal Pass it
was at least half a mile to
the water's edge. The main body
of ducks lay in the lower
part of South Bay.

The entire bay save for
cracks in the soil or isolated pools
was filled with fresh water. There
is no reason to suppose that
birds would not recover out
here as readily as in the river.
Only those with an overclose or
those that for some reason had
not access to fresh water for some
time would become unduly affected.

Extract from a letter to Mr
Fisher dated Sept. 13, 1915.

"Since the first of September
experiments with live birds here
at the laboratory have been going
on steadily. A very heavy rain
and wind storm checked me out
but I was able to continue them
in a day or two. Since the tenth
the weather has turned cold as it
did last year but as yet there
has been no snow. The river has
come up again until now it stands
six inches below the level at the
time of your visit. It will rise
more & below during the next ten
days as there should be quite a
volume of irrigating water still to
be turned in.

"After the heavy rain of September
2 the flats in front of the laboratory
were flooded with water with
much alkali in solution. A pen was
placed over one of these pools and
two Redbacks and a Green winged
Teal confined in it. The birds were
left here for 20 hours (I find that
it is not practicable to confine
birds in small pens over shallow
pools for a longer time as they
churn the water up until it is
a thin mud and the plaster themselves
with it in attempting to bathe.)
At the end of this period one

Redhead and the teal were returned
to the fresh water pens. They showed
no ill effects afterward from their
experience. The second Redhead was
placed in a pen with two other
ducks and all were given water
that had been gathered on the
flats after the heavy storm. On
thirty hours more this Redhead
showed all signs of approaching
paralysis, unable to stand and by
next day the wings were hanging
loosely from the sides and the
bird seemed in a lethargic condition.
It was placed in fresh water
but refused to drink and died.
Post-mortem revealed intense intestinal
inflammation.

Another experiment somewhat
similar in character has just been
terminated. On Sept. 10 a strong
south wind (estimated at 35-40
miles an hour, perhaps more) blew
water back across the flats at
the mouth of Channel 2 for
a distance of half a mile. The
water on the front of this
invasion was strongly alkaline
and masses of foam were thrown
up. Myriads of small Carabids,
Staphylinids, etc., and many
spiders were drowned out and
masses of seeds of Potamogeton

pectinatus were washed in
from the bay. Pintails and dead
came in to feed here in great
numbers. A supply of the water
was gathered and also three
two quart jars of the foam.
The fifth was filled with
insects & seeds. Two Redheads
and a Green-winged Teal were
confined and ~~with~~ given this
water with two quarts of the
foam. At about 40 hours
it was noted that the teal
was barely able to stand. Twelve
hours later it was dead. Post
mortem examination showed the
typical irritation of the intestinal
tract, with no other lesions
present; at the time of death of
this bird the redheads were
afflicted, became weak in their
feet and let the wings hang
from the sides. Marked dyspnea
noted (this is a symptom in
all birds with the duck malady).
These two birds were placed on
fresh water and now twenty-four
hours later seem almost normal
again though still a little
weak.

These are the first birds
of the few that I have tried
that have recovered or become
better when placed on fresh

water. I attribute this to the fact that solutions used are very strong and their use is continued until the effect upon the body functions is more than can be withstood. Heretofore birds placed in fresh water after they had become very weak have refused to drink. Water administered through a funnel introduced into the throat just the apophyses, was resorted to. Experiments with chemicals have not been as satisfactory. After trying various solutions of the Chlorides of Calcium, Magnesium & Sodium alone or also together I get the best results with all three in combination. In a Redbreast and a Meadowlark that were given a solution of 20g NaCl, 1/2g MgCl₂, 1/2g CaCl₂ in ten quarts of water the Redbreast died in 72 hours and dissections showed lesions typical of the duck malady. The Meadowlark had the proventricular walls filled with dark red cysts a trouble that I have noted in birds kept long in captivity, so it was least odd. Two experiments similar to this are now in progress.

An experiment carried out with Magnesium Chloride & Magnesium

Sulphate (Epsom salts), gives rather
amusing as no physiological
effect could be detected other
than that the two birds, so treated
ate about double what any of
the others under observation did.

In continuing the lead
experiments xxxxx am trying to
approximate a minimum fatal
dose but think that it will
vary with individuals. xxxx

When work was first begun
this year I noted a new
symptom in sick birds and
have been verifying it until
I am certain of it. Last
year I remarked an ocular
discharge in certain birds and
and this year have found
that apparently it is from
excretory from the Harderian glands
situated externally at the anterior
portion of the eyeball. I find
that whether discharge is
evident or not and the symptom
is practically always present
namely that paralysis of muscles
of the membrana nictitans is
present in greater or less degree.
This is easily tested by touching
the eyeball carefully with the
handle of a pair of tweezers, or bit
of grass stem or some other
object. The membrana nictitans

immediately responsive by coming
back across the eye. In sick birds
it may be brought rapidly across
the anterior half of the eye and
then perhaps very slowly the rest
of the way or in badly affected
birds it may merely flick
slightly in its normal position at
the anterior corner of the
eye and not come back across
the eyeball at all. All intermediate
stages are found varying with
the condition of the bird. I find
this a simple test to distinguish
birds suffering from lead poison
from those afflicted with our
so-called duck malady.

This symptom is the one now
that I have been unable to reproduce
artificially to its fullest extent in
experiments and because of this
I am not at all satisfied with
any of the experiments carried
out as yet. Occasionally I get
a slight slowing of movement
in this eye reflex or even a partial
paralysis with a slight watery
discharge from the eye but never
the full development as I see
it so often in sick birds. This
may be due to faulty manipulation
in experiment or again it is
barely possible that some new
factor creeps in here. Certainly

This symptom has been entirely
missed by other observers and
was ignored by us in the work
of last year. It should thus be
by any chance bacterial or
protozoan infection but we are
still right in our contention that
an alkaline medium is a
necessary factor in the death of
these birds. If not the birds
would not receive as fresh water.

By experiment it has been established
that Geel will maintain health
in a solution of $\frac{1}{4}$ pint of
alkali salt in 10 quarts of water
and that Redheads are unaffected
by $\frac{1}{2}$ pint in 10 quarts of
water. Now I am trying direct
inoculation in the case of healthy
birds and am giving them these
maximums of alkali salts in
their water supply. So far this
has been without avail as I had
expected.

This paralysis of the nictitating
membrane existed in Lake
birds but I am not certain ~~that~~
the case of those observed on
Lewis Lake. Whatever the outcome
of our experiments I am certain
that the latter are killed by
the cumulative effect of the
alkali salts & nothing else. If that
I am firmly convinced.

September 14, Tuesday.

Wauquaga at 7:00 A.M. 2 ft 6 1/2 inches
a sharp frost this morning
with a temperature of 37° +
The roof of the laboratory was
white with frost. The day
was clear and warm enough
to be comfortable.

After breakfast I went down
the river to the head of No 4
and then down No 4 in the
rowboat. I found the channel
that was blown in here last
summer rather narrow. In
one or two places the boat butts
caught on the sides as we
passed.

Lake No 4 was still entirely
dry and in going out No 4
I found that though there
was a good current the
water did not reach Mallard
point. It ran out toward
Mallard point in a narrow channel
and then sank into the ground.
Mud Lake was grown up with
a moderately dense growth
of *Potamogeton* that extended out
past Mallard and Swift points.
This area appeared more like
some field left uncultivated
than a dry mudflat that
was covered with ice last
Spring. There was water in

the bay half a mile out from
Mallard Point and this carried
through to the west. I admit
claims that the bay has
been entirely dry across here
this summer but I hardly
believe that it has nearly.
Many gulls were scattered along
here feeding with a few ducks.
More ducks were seen opposite
Long Point.

Pinner extended $\frac{1}{4}$ mile out
into the Bay at Mud Lake and
then continued in west past
Mallard Point. It grew gradually
thinner and more interrupted until
it entirely disappeared half a
mile east of Long Point.

At Long Point I found a
few small Scirpus islands with
vegetation entirely dead. Beyond
the shore line ran down to
Land's End. I followed down
here and cut in at a great
Bay that divides Land's End
from Hansen's Island and worked
in to the south to the river.
Ship cut across to the
old river channel, and followed
it up to Sackett's.

Hundreds of green-winged
Teal were flocked along this
old river and with them were
a few mallards, many spoonbills

and pintails. The goose was
seen.

There was plenty of water
here now though it has
come in recently. Water was
still a little low at the
upper end but was running
on rapidly.

Mosquitoes were quite bad
in the salt grass. They
have been coming since the
rain of the second. In spite
of the chill in the air they
are bad breeding and coming.

At Sackett's I found he
was busy repairing boats in order
to be ready for the beginning of
the hunting season.

Cook returned from going
in the evening and had quite a
bit of mail for me. I ordered
some new stove pipe as that
that I am using now is
borrowed.

September 15, Wednesday.

Water gauge at 7.15 a.m. 2 feet
6 7/8 inches. Clear and bright all
day. There was a heavy frost
this morning with a temperature
of 37°. A south wind blew
all day and was rather
chilly.

After breakfast we took a
lunch and went out 3 1/2
into South Bay. Left the
lunch opposite Mud Point
and rowed across to
Slughter Point. Here we built
a blind for a small
island. I may want to come
down here the first. Blinds
here are made by making
a circle of willows six feet
in diameter and three feet
high. Arrows of *Scirpus*
like them get and stand
up around the outside to
furnish shelter.

No sick birds were found
in view. The water had
receded somewhat since my
last visit and there was
much bare mud here. Coyotes
had worked all through here.

From here we went on
down to Slughter Island.
Some new growth was showing
in the *Scirpus*. Our sick pintail

was captured on Slaughter
Island. A few Green-winged Teal
were noted that were reluctant
to fly and two or three really
sickened weak. No helpless birds
were observed in the water however.

On the south shore of Slaughter
Island I found a number of
Ephydra larval pupal cases & dried
barbar and mingled with
them were quantities of seeds
of Potamogeton. These must
have washed in during the
strong south wind of the
tenth. The Potamogeton seeds
were encrusted with salt
and I think it probable that
salt water washed in here.

From Slaughter Island we
rowed on Southwest and in
about a mile and a quarter
came to Neelys Island. This
now is merely a mud bar
with stumps of Scirpus stems
covering one end. The salt
water has come in and killed
all vegetation.

The water through here was
about two inches deep and
covered a thin grey mud.
This layer was $\frac{1}{8}$ of an inch thick
and beneath the mud was
black with a strong odor of
sulphuretted Hydrogen.

For a mile to the south west conditions remained about the same. The water ~~was~~ was two to three inches deep. It gradually ~~grew~~ grew deeper first to six then eight inches. Finally at the "short tules" the depth was ten inches. These "short tules" as they are called by the sportsmen are the rootballs and short stems of an old growth of *S. cirpus*. The salt water has come in and killed them and they have been gradually inundated until now they are under ten inches of water. Large areas have washed away and many of those remaining are loose. They form small black islands that show dark in passing over them with the boat.

To this point. The water had been sitting with some current to the south and southwest. now it turned more to the west. I had tasted it all along and found it fairly fresh. Well here at this point the bottom was ~~fairly~~ ~~fresh~~ very saline. The boat was tied to an oar thrust in the mud and almost immediately salt water began to flow

past driven by a light south
wind so that now we
were in the margin between
salt and fresh.

The water became opaque
with sediment and stung my
badly chapped hands sharply.
Myriads of the brine shrimp
Artemia fertilis drifted rapidly
past. I filled a two quart
jar with water and caught
several hundred in a small
net. Many were in copulation
though few females were observed
that carried well developed
eggs. Some of the Shrimps were
very small. A few had a
reddish yellow tinge and
many were distinctly greenish
especially about the posterior
end. The majority were simply
a semi transparent dull whitish.
They were constantly in motion
swimming slowly up and then
turning head down and going
rapidly to bottom. Motion was
affected by the vibration of
the lateral fibrillae. These
moved with a wave like
motion passing from before
backward.

Pupal cases and fragments
of *Ephydra* larvae were observed
but all were dead.

Much of the algae *Nostoc* sp.
came driving past also.
In addition some bits of plant
fiber grass, *Potamogeton* etc.
and a sort of spongy that came
by in tenuous flaccid sheets
some white & some brownish
in color.

From Mud Point to half a
mile below Slaughter Island were
thousands of green winged teal
 Pintails and many mallards.
Mixed with them were
hundreds of Avocets and
in immense numbers of
Northern Phalarope. Down here
~~the~~ the Northern Phalarope was
seen in small numbers which
the only ducks I observed
were spoonbills. There was
quite a flight of them to
the southward and a
good many were on the water.
From here the Tucker
Lake House Island was
entirely below the horizon. We
seemed to rest on an immense
lake with mountains showing
all about. The water was
smooth and only with a
ripple of wind to the
south of the whole as
beautiful a scene as may

be imagined. Little Promontory
seemed only a mile or so
away but in reality was
distant four or five miles.

Yesterday with the glasses
I noted that patches of Mountain
maple on the promontory range
had turned red with the
frost and they were observed
again today.

We came back farther south
and came up the middle of
the South Bay. Flocks of Long
billed Dowitchers number three
or four thousand birds were
seen.

This is a long hard
trip down here but one of
the most enjoyable that I
have had this season. My
knees were a little sore by
the evening but were not
bothered and after a hearty
dinner I felt better again.

Water gauge $3\frac{1}{2}$, $8\frac{1}{4}$ in

September 16, Thursday.

Water gauge at 7:00 A.M. 2 ft. 6 $\frac{1}{4}$ in.
cool and sharp this morning
and cool all day.

I set up the new stove pipe
secured from Corinn in the morning
and wired it all securely.

John Wainport will go in to
Perry with a load of fish about
noon so the forenoon was
spent on working on special
mail. I am informed that
only 1000 copies of the Porto Rican
report will be printed and that to
secure separate I will have to
buy them at the rate of \$38 per
thousand. I ordered 200 if so
small a number would be printed
if not 500.

The afternoon was put in on
experiments, dissections and
writing of notes.

It turned very cold towards
evening.

September 17. Friday.

Water gauge at 7:00 A.M. 2 ft. $3\frac{1}{2}$ inches
Much warmer this morning.
I felt comfortably in my ordinary
summer clothes and during the
middle of the day it was ~~almost~~
hot.

Went down No. 2 this morning
and across into East Pass.
It was possible this morning
to get out on the flats at the
mouth of No. 2 and we rowed
and knee pushed down some
distance. When the surface
was covered with moss that
had been become dry during the
summer the going was very
hard.

On a small island I
built a blind and set out
plover decoys for shore birds.
A few greater yellowlegs and
Northern Shglarope came in
well but I missed. Shot two
Avocet. They flew by paying no
attention to the decoys. About 10:30
the flight practically ceased.

It was exceedingly hot
in the blind. About 1:30 I gave
it up and came home.

Water has gone down East
Pass now as far as I could
see. Bayless Island is still
dry. When I came down

a slight current was setting out
East Pass. A light south wind
soon turned it however and
when I left it was flowing
back.

Spent the afternoon in making
dissection of bird from Experiment #49
and in writing.

March 21st 1880

September 18, Saturday.

Water gauge at 7:00 a.m. 2 ft. 5 inches.
Warm this morning when I
got and very hot during
the day.

After breakfast I went to
Hansen's in the launch and
with Fred Hansen went by team
across to the Willard Spur. We
made this same trip just a
year ago today.

Great areas of dry Scirpus
had been burned off during the
summer. Fires had been set
by fishermen. So that growths
bordering the dry channels
were entirely gone.

Hansen says that after
the last rain there was a
great flight of Pintails over here
towards the Willard Spur.

In the lower part of the
fourth channel or East Channel we
found some water but it
was not flowing. No ducks were
in here. In the Willard
Spur water was visible only
in a small area at the west
of Willard. The area on which
I found sick birds last year
was entirely dry and evidently
had burned for most of the
summer. Far out in what

we look to be water we
could see some birds and
finally worked across to them.
~~We~~ finally came to water
in the region between the creek
mouth at Willard and the
gun club house and found it
very salt. Artemia fertilis
was abundant in it.

growths of Polamogeton had
started here early in the season
but had been killed off.

A small stream coming
down the canyon at Willard
spread out into a marsh
at the shore of the spur. In this
salt water below this were
flocks of 8 poorbills and in
the fresher water above numbers
of Pintails.

Dick birds have been reported
to me in numbers earlier in the
season but I was able to
find only the following died.

Green-winged Teal	11
Redhead	immature 4
8 tilt	<u>1</u>

6.

so that the mortality cannot
have been very great.

We looked carefully for sick
birds through the grass but
found only one Mallard that

seemed affected at all and it was not serious as it could fly.

The water in the swamps was rotten with H_2S and the mud was black and evil smelling. We worked up to within a mile of Willard and then returned to the rig by another route that took us away from the mud.

The water has been fresh early in the season. As in the dry mudflats were the remains of many carp that had been stranded when the water went down. Duck bones from last year were common also.

This fourth channel rises in the Black Slough a marsh fed by spring rising at the base of the foothills immediately north of Brigham. In high water the fourth channel receives water from Bear River near the old channel at Himsak's.

Jim Hull sent word to me by Hansen that two years ago he found birds very dead at the mouth of Sulphur Creek. He attributed this to the fact that the sugar factory wash

from Garland's cryptol. but they
are said to use two carloads
of acid in cleaning out the plant
every season. The time of cleaning
is now about at hand.

We ate lunch and then
drove up across the flats
toward the old mounds encampment.
We picked up a number of
the stones about that Harkness
wanted to take home with him
and I brought a few to the
laboratory. I found a dozen
small arrowheads most of
them more or less imperfect all
made of obsidian.

There is a great bar
across the Willard Spur now
and the water is very low.

On our way out we saw
a porcupine at a long distance
and drove up to it. It was
out on the open flats and
had just come down from the
Mountains. As later we saw
its track leading across the
shallow water in the spur.

When it sighted us it broke
into an ungainly gallop. We
rounded it up and it tried
always to present the same
back to us. The animal
panted loudly with nothing

month after a slight exertion.

Returned to Kansas about six and ~~returned~~ came back to the laboratory.

Today I had Bosley clear the sod out under the laboratory for a space of $2\frac{1}{2}$ feet back from the edge as a precaution against fire.

September 19, Sunday.

Water gauge at 7:00 a.m. 2 ft. $5\frac{3}{4}$ in. Very warm all day today or so it seemed after the cool weather that we have had.

I worked at the laboratory nearly all day today getting up my notes writing letters etc.

Bosley went in to Corinne today and brought out mail and some boxes in which to ship pintails.

Received a Yale lock for the laboratory and a jar Coplin staining jar to replace one that had been broken.

For a week now the fall hatch of Vanessa antiope have been about in the willows. The insects are brightly colored ~~only~~ perch on willows ~~themselves~~ in somewhat open places.

September 20 Monday.

Water gauge at 7:00. A.M. - 2 ft. 6 1/2 in.

Warm (this morning) but cool and pleasant for sleeping last night.

I went down the river and out 3 1/2 after breakfast. Water gauge on 9 1/2 registered 8 1/4 inches.

WE went out near Davis Island and then crossed in the mud to Slaughter Point.

Two mallards suffering from lead poison were captured and one shot dead. A number of other seal perhaps a dozen were seen that were affected but were not so down so that they could not fly. Frequently one would remain on the water after a flock had flown. As we came near it it usually got up with some difficulty and flew off low over the water.

At Slaughter Point I saw where coyotes had captured and eaten 5 or 10 birds.

The burrbrush here have suffered from the attacks of a striped *Platyphylax*. On nearly every plant the leaves had been badly eaten. The caterpillars

Simyra henrici Grote (specimens are not typical)

At irregular notches in the sides
of the leaves and in some
places ate the entire outer
covering of the blade leaving
the channeled tissue of the
interior. Most of the subbrush
growth was brown and the
insects had disappeared leaving
behind them great quantities
of droppings. On a few green
plants however I found a
number and others were
discovered eating the hard
green blades of Scirpus paludosus.
I gathered a hundred or more
in a two quart jar and
brought them in. At the
laboratory I made a cage
of wire screen with dirt in
the bottom and placed the
caterpillars in it giving them
fresh subbrush leaves. They
began eating at once.

There were thousands of
chicks on South Baye mainly
green-winged Teal and Pintails.
I have tried to form some
plans for estimating their
numbers but without success
thus far.

In the afternoon we banded
and released Stictes more Redpolls.
None of them went any distance.

September 21 Tuesday

Water gauge at 4:00 A.M. 2 ft. 6 $\frac{1}{2}$ inches.

Cool this morning but I was not comfortable in my summer clothing.

By ten o'clock it was hot.

Went up the river and out Brown's overflow. The overflow is a little shallower now.

I found that the water gauge registered exactly one foot.

A great flock of teal and pintails were feeding to the west but there were not so

many birds at the mouth of Brown's as usual. Very few were in the newly flooded bay.

I crossed the bay in toward the mouth of Sulphur Creek but saw no sign of water birds. The water in the bay was no different in appearance or taste from that in the river.

Hundreds of Northern Phalarope were feeding on the water and there was quite a flight of least and Pectoral Sandpeeps from the north.

At the Bear River Club Mr. Davis and Thorvald Olsen are down at the guide houses and Mr. Neal, Clifford Thom, Don

Davis and the other help
at the clubhouse. All are busy
cleaning up.

In the evening I went up
and stopped at the guide's house
for a few minutes and talked with
Mr. Davis. Ordered a bushel
of wheat from him.

I then went up and spent
the evening with Mrs. Mat.

He told me of meeting a
Mr. Hunsaker who had been on the
Albatross as an assistant of
Agassiz. While at Guam they
had found great mortality among
sea birds. They piled up dead
in the surf by the thousands.
On investigation it was found
that the trouble was due to a
sort of ~~be~~ ~~ring~~ parasite similar
to trachina. This was found in
the muscles. It came from
eating fish that I was affected
in the same way.

He said that in the forenoon
he had been talking with Thowald
Apsen in regard to sick ducks
and the lack of them this year.
Thowald said yes it may be a
long time before we have any more.
He said that about twenty years
ago while market-hunting near the
birds took to dying and that

Thousands of them perished.
The rufous In North Shore
Island stuck so that they
could hardly pass to shoot
them. I must inquire into
this.

September 22, Wednesday.

Water gauge at 7:00 A.M. 2 ft. 6 1/2 in.
Cool and pleasant this morning
and not too hot in the
middle of the day. I went out
3 1/2 to the Neely canal and
then down the old River channel.
A strong head of water was
coming down the canal but
in its upper end of the
channel it was still
shallow. I found few ducks
until I reached the first
fork to the west where
the channel runs ~~east~~ north
and south.

The Bulrushes along all
showed signs of the Caterpillar
work noted on Slaughter Point.
It is strange that this insect
has not been noticed near the
laboratory. The infestation run
was severe.

I dug a hole at the
west channel, in a point to
use as a blind & I may
want to shoot here one day
and there is quite a flight
up from the south.

A Western Gull was
found that was very thin
and weak. Bosley caught it.
As it was trying to live in

Some shallow water. No other
sign of sick birds was
seen.

I crossed over to the
old time channel known as
Dry willows. The channel here
now contains no water at all
and is marked simply by a
narrow depression. Quantities of
very old dead willows were seen
along especially on the south
bank. Stumps six inch through
were not uncommon and
smaller stems lying about in
confusion were abundant. As
a small mound here two feet
and one half high by ten or
twelve feet across that last
year I had considered Indian
work. I now discovered to
be dirt from the earth of an
old coyote den. Several solitary
wasps were noted about it.

On my last visit down
here a week or so ago I
picked up some fresh skunk
excrement consisting entirely of
butts remains.

Cook went in to Corvina this
afternoon with the large canoe
and the flatboat.

Some time ago Lockett & I
were talking about cattle and

I offered to put up the money
to buy some shells if we
would run them with this
and we would split any profits
between us. Today he told me
that he had found a herd of
16 that were sold yesterday and
I was able to get part of them.

September 23. Thursday.

Water gauge at 7:00 a.m. 2 ft. 6 $\frac{5}{8}$ in.
Quite hot today. I remained
at the laboratory nearly all day
getting up some official correspondence
and notes.

Early in the morning I
walked up along the willows
but did not see a great
deal of interest. The compass
plant is still in bloom. Most
of the Sweet clover is now dry
and has gone to seed. The
foxtail grass ^{heads} have entirely disappeared.
Cook returned from Corinne this
evening bringing mail. A letter
from the office informed me that
ducks have been dying on Lake
Bowdoin in Montana.

The officers of the Gun Club
came down in the evening.
Cook brought 21,000 shells 42 cases
from Corinne. 9,000 of these are
Club shells. The other twelve

Thousands belong to members, Sam
Pharmen I think has 6000 of
them. This seems like an enormous
amount of ammunition but is
at that only a fraction of what
will be used. Perhaps it may
represent two thirds or even
less of the total number. If
the shoot this season is
as great as last i.e. 12000 birds
it is less than half the
total amount.

The manager for this
season Art Ball came down
with them. He seems a
very pleasant gentleman.

Two autos came bringing
with them the full supply
of bar. It is doubtful if
it can be shipped legally now
because of the new liquor
law.

September 24, Friday.

Water gauge at 7:00 A.M. 2 ft. 6 1/2 in.
Cool and pleasant this
morning as ~~soon~~ is
threatening and the sky
was overcast during much of
the day.

3 1/2 After breakfast I went out
land down into South Bay.
Saw a few Seal that apparently are
flying were seen but otherwise
saw no sign of sick birds. The
mosquitoes in the bushes on
Clayton's Point were worse than
I have seen them any time this
season. I found it hardly
possible to stay there more than
a few minutes and then a
cloud of the insects followed
us out for the bay. They
were very bad everywhere all
day long.

There were as usual many
ducks in the bay.

All the alkaline areas now
have soaked up and are damp
even though several inches
above water.

Angie McDonald was down
the building blinds on the
west shore for use after
the hunting season.
Afternoon I made two

crates in which to ship
ten live pintails to Colonel J. C.
O'Connor Virginia Beach, Va. Dr.
Fisher had requested that I
send these. The birds are to
be used for breeding purposes.
I took large boxes and
put slate across the tops. A
tin bread pan was fastened in
one corner for water and about
six pounds of wheat will
accompany each shipment.

Two ammunition dealers or
travelling salesman came down
in a Ford. I showed
them the laboratory and the
experiment pens. And they
seemed much interested.

After that I went up
to the Bear River Club. Mr.
Davis had another bushel of
wheat for me. This is worth
80 cents now.

I tried to find an Atlas
at the clubhouse but Mr. Neal
was unable to locate one. I
tried to know the location
of Lake Bowdoin in Montana.
I finally found a station known
as Bowdoin on the Great
Northern Railroad which may
be the place.

In talking with Thorvald
Asens at the Bear River Club
this afternoon he said that he
began to shoot on this marsh
in 1890. That in 1895 or prior
he had noted in the fall that
there were ~~mass~~ ^(dusks) at times
many dead birds in the rushes.
At that time water was
much higher on the marsh
These birds were noted on
several years and were birds
that had died during the
summer as they were still
decaying. Most of them were
on the north shore of North Bay
& in the pools back of Slaughter
Point they did not occur on
open water at all. No live
sick birds were seen. At times
the stench from the bodies was
very great. No one paid any
attention to this at the time.
Chris Holt who began shooting
here at about the same time
verified these statements.
On the evening I figured
as best I could the expense
of a trip to Lake Bowdoin
Montana. Have been able to
learn little from the ticket
agent in Brigham or anyone
else but am satisfied that

The place is in the Milk river Valley not far from Glasgow. It will take two days to reach it from Brigham. The only fare that I could learn was the rate from Brigham to Great Falls Montana. This is \$17.65. Mileage to Glasgow is 276 miles. At five cents a mile this is \$13.80

Following is my estimate

Duckville to Brigham & return	\$4.50
Brigham to Bowdoin 31.45 each way	62.90
Pullman 2 nights each way 5 ⁰⁰	10.00
Pullman porter 4 days	1.00
Train subsistence 4 days @ 3 ⁰⁰	12.00
Subsistence Bowdoin 6 days @ 3 ³⁵	20.10
living here	15.00
Incidentals	10.00
Total	135.50

Estimate for subsistence at Bowdoin is undoubtedly high. And I may need no living here. Sent the following night letter telephoning it to Brigham.

Biological Survey,

Agriculture, Washington, D.C.

Please Amend food habits authorization to include Montana. May require forty dollar increase. Plan to leave here thirtieth. Return Oct. 16. Will start unless instructed otherwise by wire.

September 25, Saturday.

Went down at 7:00 a.m.

At 5 3/4 miles

I had intended to take the
pintails to Corinne this morning
and ship them. When I woke
a heavy wind was blowing.
Some rain had fallen during
the night and by nine it
was raining again and
continued until almost night.

Recently there had been
a good many horses about
and the increase in House
flies is very noticeable.

Eph Sackett, a young fellow
about 17 who shot them last
fall was in during the forenoon.
He said that when the but
pulp came down last fall in
November that he found sick
Mallards that had eaten it.
They sat around appearing
rather dopy and when
opened were full of but pulp.
He took the game, overhauled them,
some gave up it and sent them
in.

This is directly opposite the
boat Andrew Jensen & Frank Harsen
to me. These birds were observed
out #4. Sackett said that one
day he found four Mallards.

After the freeze up he found
~~of~~ two or three hundred
Mallards and a few pintails
that were sick about the
air holes. The birds could
fly a little but were run
down on skates. They were
all fat.

I am beginning to think
that I made a mistake in
leaving them last fall when I
did. An extended period
of observation would be of
value.

About five I banded five ten
Redheads and turned them
out. Nearly all these were
females and two or three
of them still had the breast
muscles undeveloped. There
are always from a dozen to
sixteen birds that hang around
outside the pens. They drift
away one by one and others
that I release take their place.

September 26 Sunday.

Water gauge at 7:00 A.M.

2 ft 3 1/2 in inches.

Last night about ten
a heavy storm with
much thunder and lightning
passed up the river and
then came back. The usual
course of these storms is
across to the south of us
from the Promontory Range toward
Brigham. They up along the
Wasatch and back again
down the river or across
to the north. We got only
the edge of the rain. I
was worried some for fear
that the roof of the Laboratory
might leak but found
every thing dry this morning.

Rain continued until
noon and the flats in
front of the Laboratory were flooded.

Men from Sackett were shooting
toward North Bay this morning.

Many ducks were swimming
up the river and lighting out
on the dry flats to feed.

This storm will
check the set of experiments
now in progress and I will
terminate all of them except
two I think.

Experiments in alkali poison
do not work so well in cold
weather as in hot for this
reason. During cold weather
transpiration of moisture is
much less and the birds
do not need so much water.
Again the effect of the alkalis
is reduced as they again
extracting water from the
tissues are lessened.

One of my female pintails
died today from lead poisoning.
This will break one of my
pairs that I was going to
ship to Col. O'Connor.
Worked on notes and
the microtome during the forenoon.

Rain continued off and on
during the forenoon. The flats
are covered with water and
numbers of ducks are sweeping
out to feed. I noted Pintails &
Green-winged Teal.

Permitted my plan for a
field laboratory to be continued
here, this afternoon.

Banded and released 5
Green-winged Teal about five in the
afternoon.

I now fall on Willard Mountain
down to about 9,000 feet. Quite
sharp tonight.

Sept. 27 Monday.

Water gauge at 7:00 a.m.
2 ft 3 in. Clear today but
very damp and windy.
Worked at the laboratory
all day. Put in three or
four hours in getting the
microtome knife in order
and then in the afternoon
cut some sections.

The launch went to Coimbatore
this morning so I sent
up the ducks that are to go
to Col. O'Connor. 4 pairs. Clipped
one wing. I met Bosley
with them but he failed to
get them off in the afternoon
train as he should.

September 28, Tuesday.

Water gauge at 7:00 a.m.
2 ft. 3 in. Clear and fine all
day. I stained and mounted
the sections cut yesterday
and terminated most of the
experiments today.

September 29, Wednesday.

Finished cleaning up
around the laboratory today.
Had the frogs put in order
and released the last of the batch.

Sept. 30, Thursday.

This morning was up at five
left Duckville in the boat at
6:15 and arrived at Corinne at 8:15
Thermometer at 36° this morning.
Fine ride up the river. Very pleasant.
The air was cool and sharp
but not too raw. The mountains
were dim with haze and the
rising sun cast purple and
mauve tints through the mist.
Parker met the boat with his
train this morning and my
baggage was soon over board.
Had suitcase, chest & baggage
with me. Got my mail in Corinne.
Found a letter from Mr. Fisher
authorizing work in Montana,
Colorado, & Wyoming and increasing
my pocket habits. Authorization to
\$200.00. I had written to the
Game Warden of Montana asking for
a permit. Mr. H. De Hart replied
saying that no permit was
necessary as either he or his
deputy E. C. Carruth of Navajo would
meet me in Malta.

Left Corinne at 8:46 arrived
Brigham 9:08 P. M. Ticket was
\$23.20 to Malta. Could get no
train until 4:15 in the afternoon.
Found that the ticket agent was
J. F. Spindler with whom I
walked down Grand Canyon in 1907

In Brigham I met Mr. Ed Ryan
of Corinne. He introduced to Mr.
Selvason at the Securities Bank
enabling me to cash a check
for \$150.39. Got a Haircut, shot
shin. Had a coat fixed, some
shoes repaired and various
other things during the forenoon.
Had lunch at the Booth Hotel,
and spent the afternoon there in
writing to Mr. Fisher & in finishing
my September Duck disease
expense account amount was
\$148.42.

Left Brigham via U. S. L. at
4:15 P. M. Bought Pullman through
to Butte.

Met James Lundeen in the
forenoon and had quite a talk
with him.

Fine and clear all day and
pleasantly warm.

North of Brigham we passed
what must be Box Elder Lake a
shallow expanse with no birds
visible on it. Above here the

track led up a broad valley
with Bear River to the left.

Finally we approached a
great notch in the hills through
which Bear River enters the valley.
A great bite has been cut off
from the main mountain

mass and stands out as a
landmark the notch being visible all
through the valley in clear weather.
At this point the river was
snow swift and full of rapids.
It has cut a gorge through
the hard rock ~~that~~ hundred feet
or more deep and runs
across the bottom.

Entering the canyon it was
very narrow, a few plants
stood here. On each side of
the canyon are irrigation ditches
and finally we came
to the dam. Both ditches still
run full of water and at the
dam the entire stream was
diverted. No water passed over
the dam at all but quite
an amount went through it
either through spillways or
through leaks I could not determine
which. When this dam is
opened a great volume of
water will come below.
At present there is not 1/10 the
volume of water that there is
at the mouth ~~at~~ immediately
below the dam.

Above here the water backed
up for a long way. Finally we
came to Cache Junction. Beyond
there was a broad valley. The

Mountains on either side and
a light fall of snow. The river
flew again above the fall point
was broad and placed & only
occasional small growths of
willows showed. The most places
the banks were bare denuded
presumably by man. Country was
very well cultivated.
I saw many marshes but
all were entirely dry.

October 1, Friday.

Arrived in Butte Montana
6:45 this morning. No train
went north to the main line
until 3 P.M. so that I had
most of the day before me.
Walked up town had breakfast
and then made a full dinner
reservation to Malta Montana
at the great northern office.
Rate \$7.50

At nine I went over to
the Public library and did
some reading on cholera des
poles etc until noon.
A very good library. Many of
the books seemed to have been
damaged by fire.
In the afternoon I walked
about for awhile, bought a
new hat and did a little

mon reading. Left at 3:00.
It was clear all day
with scattered clouds.
A great deal of smoke
hung over the city from
the smelters but drifted
away as the place is on
a hill.

On leaving on the train
the track swung around
in a great horseshoe
around a small valley
and ascended along the
opposite slope. The hill
on which Butte was located
came down to the level
in a broad swell. The
struts running up will
from the depot but the
descent is rather gradual.

Smelters and plants were
protected by tight board
fences, with tops studded
with nails and guarded
further by two wires lightly
charged with electricity. These
operated an alarm system.
These precautions were due I
was told to recent labor
troubles.

The hills at Butte were
entirely bare but around the
other side were covered a

canyon with its sides
covered with little white
pines and with, Alder, wolf-
berry Betula and other
characteristic shrubs along
a small stream that we
followed. This seemed fine
country but though I
watched closely not a bird
was seen.

Reached Helena at six a
very pretty place. Sunnyside and
Boulder Town attractive also.
Foliage now through the
canyon was touched with
frost turning it to dull red
and yellow that was very
beautiful. Save for its lack
of bird life I have never
had a more pleasant
railroad journey.

I intended to retire
early but met a young
Geologist & mining Engineer
and talked with him until
ten.

October 2, Saturday.

Arrived at Malte 6:00 a.m.
did some work on notes & ~~completed~~
completed report on monthly expenses
of account.

Following is copy of Form Bi-130.

Letter of authority 20-Bi	
original allotment \$1000.00	
Month Sept 1-30, 1915.	
Amount available at beginning of period	553.59
Total expenditure for period covered	203.32
Unexpended balance	350.27
Estimated Expenditure for coming month under this authorization	156.00

incurred to 31.01

Called Mr. C. F. Carruth, Deputy
Warden from Navarre at the Milk
River Valley Gun Club and he
told me that some one would
come in after me. Mr. C. F. Mates
manager of the club came in
about ten. I met Mr. Coster
president of the club and Mr.
M. Skowley at the hotel. Mr.
Coster said that a good many
sick birds had occurred about
Sept. 1, but thought that I would
find none now. He attributed the
trouble to this: that about
the lake were several spots where
there was much alkali.
Usual during the season.

There is much wind which
keeps the water stirred up.
This past season however the
lake had lain absolutely quiet
for 6 weeks or ~~on days~~ upon
the water being stagnant. This
he thought would increase the
amount of alkali at the bad
spots.

Mr. Malt took me out
in his Ford. The Clubhouse
is 9 miles from Malta near
the line of the Great Northern.
The country here was rolling
and a somewhat sandy
loess(?) A few Meadowlarks and
some Horned Larks were seen.
Also noted a Swainson's Hawk and
one Jim Kildee.

The Milk River Valley Game Club
has about 77 members throughout
this part of the State. Dues
are five dollars per annum. This
is supposed to pay for improvements
while the club is self supporting
during the run. The Clubhouse
is a large structure 20 x 40 feet
and is well finished inside, with
hard wood floors, painted brown
board walls & ceiling. The second
story is a dormitory with a
row of beds in it. Board two
dollars per day. Round trip to
Malta \$8.00.

I found Mr. Carruth a large
man and a great talker.
He told me that he came
out here this year the first
second of September and that
in going about the lake he had
discovered large numbers of
dead ducks and a few sick
ones. Half a dozen were gathered
up & shipped alive to Helena,
then to State game warden H. C. Hart.
Certain of these were examined
by a Druggist Carl Starg who
pronounced them to be a cholera.
Others were sent in to Washington.
Now seeing these sick birds
were afraid to shoot & eat
the ducks flying for fear of
some poison in them. Just this
has entirely spoiled the season
for the gun club. Last year
1875 were taken in during Sept. by
killing this year in the same
month receipts were only \$5.00 & \$60
Sick birds practically disappeared
by the middle of September and
good the season was over.
He shot with me in that
fall was much concerned
over the matter and those
concerned in the management
of the club wanted to know
what it would not occur
next year. Apparently no one

found much about it. I found
Mr. M. at the clubhouse ^{informed me}
in the matter and considered
most of information gained
from him unverdaadement. He
is directly interested in maintaining
the club and said that the
publicity given this thing had
killed the season for the club.
I found Mr. Carruth in a
hurry to get home which did
not work out. He set a
rather incubated the idea for him.
Not well informed on local conditions.
After dinner we went out
in a canoe to look things over
and after considerable engine
trouble we were off. We went
to Woody Island and
looked around. Will not detail
observations now as I expect to
visit this place again soon.
Tomorrow. Two sick green-winged
Teal were seen but could not
be captured.

Mr. Carruth had a
Spoonbill alive for me that he
had captured yesterday. Typical
chick malady.

The morning was heavy
with fog. Later the fog lifted
a gray sky and then
it began to rain - old chant

Toward evening.
Met several club members.
They got fair shooting but
nothing extraordinary. The
men brought in several
Canvasbacks, Gadwall, wigeon
a few Cinnamon Teal. An H. & a
Bufflehead. Also a few Green
Wings. Wilson & wife are home
about the clubhouse.

October 3, Sunday.

Daylight comes much earlier here than on Bear River. It began to get light about a quarter past five. Every one else was up so I went out too. A cold wind was blowing & rain in from the north and it was raw and disagreeable.

After breakfast I worked on the birds on hand making some careful dissections. The live bird secured by Mr. Caruth was all the symptoms of a bacterial disease. Lesions were present in lungs and kidneys especially. It had all the appearance of avian cholera of one variety or another. It is entirely distinct from the Utah trouble on which I have been working. So companion with the sick bird I opened a Spermhill that I shot last night. To my surprise I found its spleen greatly swollen and enlarged. This bird as others that I observed seemed a little reluctant to fly but got up well when it started. It may be that all these are affected. A third bird picked up dead by Mr. Caruth was evidently a cripple.

Mr. M. S. Kowler of Great Northern Hotel, Malta Montana. Gave me some information in regard to

the sickness. He was down
here in August about ten days
or a little longer previous to
the opening in B.H.L. He noted
a number of dead birds floating
in the water vegetation in front
of the clubhouse. On going to
Wood's Island in a canoe a
large sick bird was picked up.
They could swim but were unable
to fly. Usually they dove and then
coming up were easily captured.
The head and neck seemed
affected. Several of these birds
died in the canoe on the way
to the clubhouse. Two sick
birds were picked up but these died.
A sick pelican was seen. Three
sick birds entirely helpless were
taken in to Malta. These ~~are~~
died before reaching town.
The other three in about a week
were able to walk. They were
abundant. Their wings were
clipped and they were released
and a pond put in a day or
two afterwards.

About ten the rain slacked
up and I walked out near
the border of the lake to the south.
The lake lies in a depression
between low rolling hills that
seem to be of glacial origin.
The soil is full of gravel raising

from small to small boulders.
The hills about ran up to
fifty or sixty feet in height.
I walked out across a
low meadow most of which
was in a hay meadow. Low
areas immediately back of
the tule bordered margin of
the lake were seen but were
evidently inundated in high
water. Low places were
covered with a growth of
Cyperus. That on casual
examination seemed to be
paludosus. Large areas of
dead fox tail were noted
with conifers, depressions filled
with grassy growth were
common and numbers of
small circular depressions
filled with water and many
straw weeds were noted.

A few Smith's Longspurs
were seen, Bitterns were common
& I saw a few Western Tn
& parrows.

After noon I took a
small stud boat belonging to
Mr. Caruth and followed down
into the Bay south of the club house.
The water here ran from two
to four feet deep. The shore was
lined with a heavy growth
of tules varying from a

more fringe to ~~small~~ two or
 three hundred feet in width. In
 shallow places were tube islands
 large and small. Back of these
 tubes was usually a belt of
 Scirpus and this the shore.

At the south end open water
 heaved and a Scirpus ground
 marsh extended $\frac{1}{2}$ mile south
 to the great Northern Railroad.

At the edges of the tubes were
 a few sharp sticks caught in
 the stems and a few others
 lay in the growths of *Solanum*

in open water. I examined the
 fresh area to determine whether
 for not they had been shot. I
 found the following that I
 considered had died of disease.

Gunning Seal	4
Coot	3
Wigeon	1
S. S. S. S.	1
Western Grebe	1
Immature Seal	1

Back of the Scirpus marsh
 at the south end was a narrow
 band of open ground with
 alkaline soil upon which a
 dense growth of some halophytes
 Chenopod was springing up.
 When pools stood here the water
 was intensely alkaline. This
 open area is bounded above

By ~~the~~ a slight rise to the
grassland and marks the
high water flood mark. By it
and in the grass above it
were a number of birds that
had died from two to six
weeks ago. Apparently they
had crawled up into the
grass from the water. I
found the following.

Pintail	13
Spoonbill	3
Mallard	5
Sandpiper (unidentified)	2
Killdeer	1
Bittern	1

As a rule these birds
lay on the ground. Pre-liminary
Animals had destroyed many
others. Bitterns were very abundant
in this grass. Many fish were in the beds.
I was told that they were
carp.

Toward evening I sat in
a blind in a point for awhile but
shot nothing. Earlier I got a
right & left with a Cinnamon
& a grunting.

All members of the club
went back to town today and this
evening.

There is some violation here.

21. The Larceny of Malta got
at least 25 birds during the
forenoon & then went out again
after dinner.
Was tired & sleep, tonight.

October 4, Monday.

A heavy frost covered the grass this morning but the day promised to be clear. After breakfast at seven P. took the small stud boat with bow being oars belonging to Mr. Caruth. Though the sun was shining a heavy fog came in and obscured everything for an hour. All outlines were muddled and distances magnified. Pipits along the shore seemed large as Fox Sparrows.

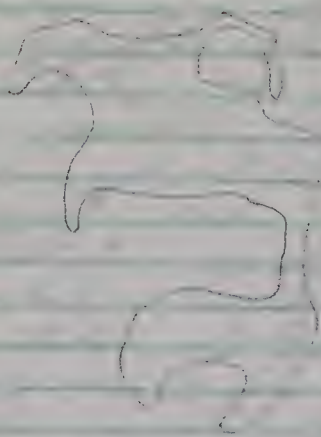
In the Bay in front of the clubhouse is a dense growth of *Potamogeton* that appears to be *pectinatus*. This extends out from shore for a quarter of a mile or more. It grows in great islands with trails leading around. None of them are continuous but are blocked some or later. There are many coots in this growth.

I followed the shore down toward Woody island landing in several places. The shoreline was a gravel beach five to twelve or fifteen feet wide back of which was a bank from two to four feet high on which was the usual grassy growth.

The waves had rolled in great masses of Potamogeton till along so that it lay a foot deep and in masses two feet high. The waves went back slowly into the shore.

Wood's Island is irregular in outline and has an area of about three acres. An outline map of it is shown on the next page. The island itself resembles the mainland exactly. The soil is rough and gravelly and the outer beaches are of sand and gravel steep in profile with the waves cutting into the humus above the gravel.

The northern half had some growth of greasewoods and *Opuntia* is scattered through the grass. It rises in the center about fifteen or twenty feet above the water. On the north east hook or peninsula are a clump of willows and a tiny broad leaved Cottonwood. From these the island takes its name. On the southern lobe in the center are also a few greasewoods. On the broader part of the southern section are also a few greasewoods. On this willow were several great Blue Heron nests



and among the greasewoods
were a number of Canada
Goose nests. I saw three that
had not hatched. On the
southern lobe had been a
rookery of Common Terns and
I think of Franklin & Ring-billed
Gulls also.

On the northern elevation I
found a few prairie dogs and
a small buffalo horn was
picked up.

The mouths of the three
deeper bays were choked with
mud. All the bays were shallow
with muddy bottoms. Back of the
city shore was a strip from
ten to thirty feet wide that

was bare of grass except
in its higher part. An *halophyllum*
Chenopod one to two inches high
was springing up on the
higher part but toward
the water it was bare.

This marks the flood plain
could at extreme high water.
The soil was strong with
black alkali and in places
a white loosely crystallized
encrustation of *Sodium bicarbonate*
had form. The mud in the
lagoon was partly clup
and black which in most
places it gave off a strong
odor of sulphuretted Hydrogen.

The water in these bays
was practically stagnant
and near the bays was
strongly alkaline to the taste.

Dead birds were common
and practically all were found
lying either on the ~~ground~~ ^{ground} ~~just~~ ^{just} above the water
or in the grass immediately above
it. I went carefully over
the entire island identifying
the carcasses found and
used much care in the
identifications. A surprising
numbers of species were
found. Following is the list.

Eared Grebe	1
White Pelican	2
Great Blue Heron immature	3
Bittern	2
Ring-billed gull (adults)	17
Franklin gull (im.)	6
Gulls undetermined	2
Spoonbill	27
Santail	68
Green-winged Teal	125
Gadwall	2
Mallard	1
Ruddy Duck	1
Common Teal	4
Redhead (adult male)	1
Canada goose	1
Ducks (undetermined)	35
Common Tern	28
Black Tern	1
Coot	1
Wilson Phalarope	7
Lesser yellowlegs	45
Ereunetes sp.	15
Little Sandpiper	5
Marbled Godwit	23
Baird Sandpiper	8
Wilson Snipe	2
Solitary Sandpiper	1
Avocet	2
Least Sandpiper	2
Buff-breasted Sandpiper	1
Dowitcher	1
Pectoral Sandpiper	4

115
34
4

445

Knot	445
Snowy Plover	1
Killdeer	1
Song birds undetermined	12
Yellowheaded Blackbird	7
Pipit	1
	18
	4
Total.	468

In the case of single individuals there is some doubt as to the advisability of including them in the list of all given here. All these birds lay on the breast usually with the feet under them and the head lying on one side in front. Most of them were immediately in the open but a few had crawled up into the grass. On the open ground (I know of the island) I saw very few birds and most of those that had washed in. It took me a while that had been shot & had not been picked up.

The carcasses were all still with few exceptions. Many had the short Chenopod and were almost hidden from this fact and from the many migrant songbirds it would seem that the trouble occurred in the early

part of August continuing
the sunlit day, were
glorious a few days previous
to the first of September.

Mr. C. F. Mather, steward of
the Milk River Valley Iron Club, tells
me that this season the
water in June was two feet
higher than at present. By July
the storms ceased and during
July and August the water
went down. These months
were rainless with practically
no wind. It was during this
period of stagnation that the
trouble came.

I searched the island carefully
but could find no live birds
helpless save one Wilson's
Eggs. This bird showed
symptoms of cholera and
was very thin. It could walk
about but could not fly. Its
wings drooped from the carpal
joint. The green winged teal
that I thought was affected
was seen but could not be
caught.

As this island is cut off
from the mainland and is
predacious mammals have
access to it none of the
birds have been disturbed.

I brought in skeletons of
some of the more desirable
ones to be preserved.

This island seems to be
right in the direct line
of flight from the north.
Two or six hundred Carve-
backs came in during the
forenoon & swung around.
I saw birds mainly Black-bellied
Plover & Pectoral Sandpiper were
passing continually. I shot a
Harris Sparrow in the clumps
of the willows.

In the afternoon the wind
came up and when I started
back about 1 pm I had a
little trouble with the waves.
The steel boats are too
small for rough water. After
starting once I returned to
the lee of the island and
covered every thing so that
it would not get wet. My
gun, camera & field glasses
I tied to the boat. I
did not have as much
trouble as I anticipated after
all - and was wet only
by spray splashing from the
front of the boat. I leaning
the clubhouse the moose
held the waves down. Many

Cott & Land & the tower getting
more to wood. The wind is
- but very light.

at the out-house of out
Mr. Spader whose was a
household name. He tells
me that the lake is of
recent origin. That until
12 years ago was a channel
some years ago. There was
Mr. W. a small body of
water here. Now it fills
up from Grand Lake.

He said that last year
the large irrigation ditch
above it was filled with water
for about 10 days the dam
broke and the water ran out.
Small pools remained in the
bottom of the lake or from which
said Kallan & the Samfingers
were found about there.

Mr. W. said that when
the lake first opened that the
water was used for drinking
& cooking. Now almost none
is drunk. The water has a
pungent yellow appearance and
a slight taste. It seems good

for drinking. It is not
very good for drinking.
It is not very good for drinking.

October 5, Tuesday.

This morning the sky was overcast and the wind came down from the Northwest late in it grew stronger and swung into the North cutting quite cold. It was entirely too rough to get out on the lake. The sun was obscured all day.

During the forenoon I worked at the clubhouse caring for the birds on hand & making observations. After dinner with Mrs. Tjaden I walked for a mile & a half along the big irrigation ditch above. I found several pools of water but failed to note any sick birds or any carcasses. The wind blew a gale across here and a few Horned Larks, pipits & in the Sparrows were the only birds noted. We returned to the clubhouse along the lake shore. The ground was covered with snow. No chick birds were noted along here at all. There were great growths of Fox Tail grass along here. I brushed a few ~~low~~ Alaskan hares & left my. Returning to the clubhouse I went out again to the

south through a growth of
Sagebrush & fat willows ^{the} stretching
large. I was thus attending for
about 4000 but saw no
more than half a dozen in two
miles.

I shot one large Lepus
campocarpus and preserved its
skull. It was a female.

On either side of the anus
& vagina I found a tan spot
of skin about an inch in
diameter. The vagina was on
a slight eminence and on either
side at its base was a pouch
like sac with an opening a
quarter of an inch across. In
this was a thick oleaginous
secretion mixed in small particles
with a strong animal odor,
two scent glands. The eyes
were brownish yellow. Anal
temperature 102.4 F. The animal
ran a few feet only & then stopped
& was shot. Length 655 mm.

Tail 120 mm. Hind foot 150 mm.

On the strong leopards inside
hung closely to cover.

October 6, Wednesday.

Gold and very windy this morning. Waves were running very high on the lake. The sky was heavily overcast and occasional light rain fell that was almost a sheet. I worked from seven until ten in the weatherhouse caring for the birds in hand. It was very cold and my hands were chilled.

After dinner I went out in the boat and crossed the south bay in shelter of the moss and came in behind Rush Point. It was not practicable to get around the point because of the wind.

The waves washing in here have built up a bar behind which is a lagoon grown entirely with tules. The waves had washed in a great mass of *Potamogeton* filling it up in a windrow in places the feet high. I followed along this until I came to a small open lagoon.

On canvasback I came by & I shot but the bird fell far down the bay. I shot one widgeon & two green-winged teal.

Wilson Snipe & a few lesser
Yellowlegs were feeding on the
pondweed in Polamogaton.

Ducks were gathered in
the open lagoon out of the wind.
As they sat out I dropped a
Pintail & a Scaupbill. A sick
Pintail dropped out into the
grass & I caught it.

I then went with a few other
birds flying over in a open
space ~~that~~ bordering the edge
of the lagoon that had been
flooded earlier. All the birds
lay on the breast with the
head up on one side in front
but under body. Perhaps I think
these birds not quite full grown
from a distance of 120 yards
I listed the following.

Scaupbill 12

Green-winged Teal 11

Pintail 6

Common Teal 3

Gull-wing 3

Mallard 1

Blue-winged Duck 1

Ducks not determined 5

Loons 3

Lesser Yellowlegs 1

Shorebird uncertain 1

I followed down here to
the point at which I began

To count birds on my trip of
 last Sunday. Birds were
 scattered along here in
 small numbers. All being
 dead as the others. Between
 the marsh & the grass was
 narrow band of ^{gravel} flat on
 which was covered in places
 with an encrustation of sodium
 bicarbonate. Along here I found
 the following.

Spoonbill	43
Greenwinged Teal	41
Mallard	4
Pintail	17
Gadwall	1
Pigeon	1
Ruddy Duck	1
Cinnamon Teal	1
Goose (Canada)	1
Duck not determined	3
Western Grebe	1
Eared Grebe (young)	1
Coot	2
Common Tern	1
Ring-billed gull	2
Erismater	6

Many of the Spoonbills were
~~scattered~~ among the birds. For
 a long stretch I found only a
 few birds and I did not count
 them.

there were a good many
birds that had washed in
from the lake in the moss but
I took no account of them. Many
birds are crippled or lost here
in the shooting and the majority
of these came from this source.
I found a wing-tipped Spoonbill
& a Gadwall & I willy their
nests.

The wind went down toward
nightfall.

October 7 Thursday.

Last night it froze hard
forming ice in barrels and pails.
This morning it was almost
clear and was still but
very cold. About seven thirty
I started down the lake
for Goose Island. Ducks were
flying fairly well but not as
yesterday. A bunch of geese
passed but were out of
sight.

I reached the island a
little before nine without incident.
This island is 125 feet long by
fifty wide. It is oval in
shape and has a gravel
beach all around. Long points
open and low extend out
from either end. The island
lies ~~east~~ north & south
is general trend. The surface
of the island is elevated
four to six feet above the
water. It is being slowly
worn away by the waves.

Greasewoods & Atriplex
cover the surface and there
is one small ~~narrow~~ broad leaved
Cottonwood. Every where on the island
are great Blue Heron nests. I
counted 110 on the whole
island that apparently had
been occupied during the

past summer. They were
built up from the ground
to a height of one to three
feet or at times were barely
four inches high. All were
round. Two feet or more in
diameter and were composed of
small bits of greasewood.
Building material must be at
a premium in a country like
this. Sometimes a small
greasewood was staked as a
foundation and again the
nest was placed in the open. Several
nests were at times placed so
that they touched. Along the
beach nests placed in greasewood
were frequently four or five feet in
the air as the soil had
washed out beneath them. These
nests were very firm in structure.
Two were placed on the beach
in such a way that they
blocked the passage around the
island. These were three feet from
the ground. On working over
the island I stepped on them
to get by them at many times
without breaking them down in
the least. Very few dead young
were noted. In nine nests in
the 110 I found pellets containing
bird feathers. A shell case of this
was gathered. In this case

these might well be birds
that had been picked up sick
or dead along the beach here
or on Woody Island. The
great numbers of these birds
~~being~~ especially the shorebirds
lying dead this past summer
might account for this large
number of nests at which
pellets were found. Most of
the pellets were flattened out
like pancakes and in many
cases a number had
merged into one mass.
A few entire ones were found.
All about on the ground
were signs of white pelican's
nests. The number of their
chalky eggs were picked up.
Sometimes these nests were
placed upon a circular spot
of 8 inches across and elevated
two or four inches above the
soil. These were composed
of humus but had originally
been horn nests I believe.
I have heard that large
numbers of the young pelicans
had died this summer
but I saw very few on the
island.

This would be a fine
place to collect shorebirds in

their usual & autumnal movements.
Migrant Black-bellied Plover, Sanderlings
& Pectoral Sandpipers. I dropped
in every few minutes lighting on
the sandy points and all
disappeared easily. I shot four
plovers & a sanderling.

About the beach on one
end were forty or fifty dead
Eremites. And a few least
& Pectoral Sandpipers. As well
as two Sanderlings. While examining
these the wind freshened and
the waves began to run at
such a rate that I had to leave
suddenly for fear of getting
caught.

The small striped water snake
was seen. Woodcock, Catfish
of the isabolla sort were very
abundant here.

From here I crossed to
Long Island immediately to
the north and about a
mile away. It was rough
for a quarter of a mile but
then I got in the lee of the
island and got along without
trouble.

Long Island is about ~~thous~~
hundred feet long and varies
from ten to fifty feet wide.
There are two small Broad leaved
Cottonwoods and several small

willows upon it. These willows
have a grey bark. I cut into
one thinking that it might
be the heart willow but was
disappointed.

The island lies approximately
east and west. The western
half rises ten or twelve feet
above the water in the
roughed hump and the
western end is low. The
the further part is a growth
of a tassel and behind it
the dense growth of a woody
stem of *Urtica*. There are
several clumps of *Urtica* about
the island. I found an
insect *Camus* *flavus* west.

After examining the island
I built a small blind in
the eastern end. Brown headed
green winged teal & *Sporophila*
came in constantly. But I
paid no attention to them. Two
Pomarine, a Lesser & a
Greater Redpoll in turn came
up behind me and got away
without a shot. Finally four
Common Loons came down and
were called in by a low
quack. I thinking up of
shot a male but missed
with my second barrel. A

few minutes later. I dropped
my gun, making a ^{big}
pain and was then content to
stop and eat my lunch.

About two ~~hours~~ ^{miles} to the
westward was a large bay
with a small round island
and a long gravel point
projecting into it. Ducks
swarmed out here resting
feeding & sleeping. Most of
them were fuliginous species.
About two thirty I crossed
to the main land & followed
the shore back toward the
clubhouse. I found a series
of muddy sloughs along
here formed by waves throwing
up bars behind the points
and cutting off small bodies
of water. One was entirely enclosed.
Much alkali was found on
the lake shore back of this &
the low lying ground was
swampy.

Along here I picked up one
sick green-winged Teal and
saw three others. One of these
I shot but the other two
escaped. As this deep water
it is difficult to capture them.
Also captured two sick
Coots. These birds act

as sick birds etc on Bear
River and about the partial
paralysis. The same being
noticed. There is no
other discharge apparent
however.

In the evening this
was the flight of Ravens
from the South & I shot 1
Barn Owl.

The wind blowing to the
South at night.

October 8 Friday.

The wind changed to the south ~~that~~ night and although it froze in the morning by noon it had warmed up and was comfortable. I was glad of this as I worked on skinning birds and making dissections all day in the boat house. At first my fingers were so stiff that I could work only with difficulty but later it was warmer.

Charlie Mater, manager of the Club and H. H. Palmer, a guest were out ~~yesterday~~ today in Woody Island and brought back a large number of ducks. They had somewhere around sixty I think though I did not count them. These birds were hung up over night and my estimate of their number was made from seeing them at a distance. Palmer I do not think got over the limit of 20 but I know that Mater killed a great many more than the limit. He did this to supply the table at the Club.

The members of this Club are all honorary game wardens with the power to arrest. They do not hesitate to shoot more than the limit however when they have a chance. Their excuse is that there are so many days when

they get only half a dozen
and say that they have and that
the more birds they can get
them. Rather a poor argument!
There are no windmills. There
are only telegraphing. The birds
are in a small area.

Great numbers of birds that
are shot are now dropped and
lost.

Mr. Miller's sister's, who
is the breast. Very and then
put them down in black oil for
various.

October 9, Saturday.

This morning it was sharp and cold again but warmed up later on. I made up 8 or 10 Blackbird skins and skinned a Spermill a male in full plumage. and then proceeded to pack up. Had an express box and a large box by mail.

Subsistence here at the clubhouse is \$2.00 per day. Transportation in auto to and from Malta \$4.00 for the day. Mr. Palmer went in with me so that it cost us \$2.00 apiece.

We left the clubhouse about two thirty and arrived at Malta at three. I was sorry to leave this country without visiting the Mill River but did not have time for this trip. The broadleaved cottonwoods and other growth should yield other species of interest that I have not seen. The river passes Malta on the outskirts of town and is about four miles from the clubhouse at the lake. The cottonwoods are yellow but still retain their leaves. I had

I had a number of errands in Malta. Bought a new trunk, rope, a blanket, purchased a ticket, checked my baggage and had a bath at the Fifth Avenue Hotel a new hotel

Recent cost was fifty cents.

Met Mr. Mings (spelling!) and Mr. C. Ellis both old hunters in this locality. They have known the lake for twenty-five years. Mr. Ellis told me that three years ago he had seen many dead birds about the lake & the morning of the shooting season but had paid no attention to them. He did not doubt but that they had been sick.

Mr. Mings gave me the following clipping that he had cut from a paper in New Rockford, North Dakota and sent to Mr. Ellis.

Hundreds of dead young ducks have been found along the Mouse River according to reports brought in by hunters. It is believed that a malady has attacked the young ducks, probably brought on by something they have eaten.

He thought that it came from the Minot, N.D. Paper but was not certain.

The hunters here all believe that only young birds have died but this is not so.

Mr. Harry Cosner told me that he has noted a few dead eagles every year.

Ate dinner with Mr. Palmer.

And then did some writing after
ward.

Wrote the game warden of North
Dakota at Bismarck and the Forester
at Minot for more information
regarding the sick bird. I wrote Mr.
E. C. Carveth, Deputy game warden at
Havre Montana, thanking him for
the use of his boat etc at Lake Shoshone.
Wrote also to game warden J. L. McKent
at Helena, thanking him for favor.
I told him that apparently trouble
among the birds had subsided as
in Utah, and that sportsmen
need entertain no fear of having
birds this winter be affected.

At the beginning of the season
every one looks up and of the birds
from the lake and I did not
get them.

Left Minot at 11:20 P.M. cold
and sharp.

October 10, Sunday.

Was up this morning at seven.
Found that we were passing
through a somewhat rolling country
with the Missouri River not far
away.

From Fort Benton to Great Falls
we followed close to the stream.
Large cottonwoods fringed its banks
and willows were abundant as we
passed many I could see an

Arctostaphylos - buck brush and other shrubs.

Birds life was scarce. One Magpie was seen near Fort Benton.

At Great Falls a light snow mingled with mist came down. I saw the Falls in the Missouri River from which the town takes its name and found them about 30 feet high. Other smaller cascades were below them. A flock of pintails passed over while the train was standing in Great Falls.

Beyond Great Falls the road again followed the Missouri. At Cascade the stream became more narrow being 150 yards wide, with shallow and with a swift current. The water was clear. Magpies were seen at Cascade. A dozen hunters left the train there and I saw several boats containing hunters along the river. One lone green winged Teal was seen and other ducks that were not identified.

The hills through here were pointed and angular. They gave place suddenly to rocky bluffs irregular in outline. The river became more swift with boiling eddies and the track passed through a rocky canyon where

The scenery was wild and beautiful. There was considerably white pine here.

Beyond Helena I saw Englemann's spruce. The colors in the vegetation were not so brilliant as when I passed through ten days ago. Snow and rain fell all along, and the mountains were whitened with the first fall of the season. At Butte considerably snow lay in the higher mountains.

At Butte which was reached at 3.55 P.M. I transferred across town to the Oregon Short line depot. Bought a ticket to Corning, Pullman to Brigham and checked my baggage. Was not able to buy through fare the station at Malta.

Left Butte at 5:05 P.M.

Some snow was falling in Dillon.

October 11, Monday.

Arrived at Brigham 6:22 A.M. Found the morning cold and sharp.

Walked up town, had breakfast at the Booths Hotel made a few minor purchases and then returned to the depot. Wrote the office arrival in Corning and then wrote until train time.

Met Mr. Benson & Dr. Dart.
Dr. Dart is ~~the~~ one man with
whom I have talked who fully
agrees with my alkali theory.
He says that the eating away
of the mucus lining of the intestine
could be accomplished only by
a strong acid or an equally
strong alkali and that it is
without doubt due to the latter.
He said that Mr. Stewart had
practically given up his acid
theory.

Dr. Dart is one of the
prime doctors in Salt Lake City
having been there 35 years.

Left Brigham 10:20 a.m.
Arr. Corinne 10:30 a.m.

Sent baggage to the boat by the
club wagon. Got my mail
and then left about eleven for
the gun club. Arrived about one.
Found every thing at the laboratory
in good shape. Spent the afternoon
in unpacking, etc. Got the
motor boat to running & everything
in good shape.

October 12, Tuesday.

This morning I finished
cleaning up and straightened out
the skins secured at Montana.
They came through in very good
shape. Cleaned and embossed

in paraffin. The histological material
remained at Lake Bowdoin. It
was not completed until nearly
nine at night.

I am sleeping here in the
laboratory and found the floor
rather hard the first night.
The thermometer stood at 30°F
this morning and there was
a heavy ~~and~~ frost. Later in the
day it was more pleasant.
I am told that shooting
is not so good as it has been
in other years. This year in
October I only about 175 ducks
were brought in to the duck house
while last year over 600 were
killed. All shooting practically
is done from sick boxes. The
Duckville Gun Club now has
about fifteen out in the South Bay
and the Bear River Club is using
them also. I was told that
the best shooting was all far
down in South Bay. The greater
number of ducks that are secured
down there are Spoonbills. Few
mallards and pintails are taken.
The men shooting from the
mud boats have by far the
best of it. As shooting from
shore blinds few birds are killed.
The shooting in East Pass

is not good at all. Very few birds were killed this on the first.

I am told that the hunters are staying within the limit of 50 birds i.e. twenty-five for themselves & twenty-five for the guide very closely. When they want more they take out another guide. They seem to be afraid. Even some who before have paid no attention to the law now bring in no more than 25.

On case of shortage of ducks at the clubhouse either for sale or to supply members guides are sent out to shoot. They are allowed their time for doing this and the ducks are purchased by the guides at the usual rates.

Oct 13 Wednesday.

It was somewhat warmer this morning and promised a storm but cleared up later in the day. Early this was quite a fall of dew. I walked up along the willows and looked over my duck pond and then went on up for a short distance. No birds were seen in the willows at all.

I am told that a member
of the Bear River Club shot one of
my tame Redheads in front of
the Duckville Gun Club while it
was sitting in the water though
men yelled at him telling him
not to shoot it. That must be
great sport for one who is
hunting ducks for the excitement
that there is in it.

I made a number of
dissections etc this afternoon.
Secured the heads of a white
fronted goose & two Snowgeese
this morning at Sackett's. They
had for bands for me and
Es Sackett said that he had
mistaken another.

This evening I was
invited to dine at the Bear
River Club and went up about
at a quarter of six remaining
until nine.

I met Mr. J. C. Nulley, Mr. Painter,
Mr. Culbourn, Mr. Currie, Mr. Porter
Mr. Sanborn and one other gentlemen
whose name I did not recollect.

They entertained me very
courteously and I spent a
most pleasant evening. All seemed
much interested in my work.
Mr. Nulley and Mr. Culbourn
were especially interesting others.

Mr. Nuby asked me if I
expected to ~~require~~ be here next
year and I said that I
doubted so and he remarked
that probably a new ^{in prospect} ~~approach~~
would be necessary and that
he thought that he could do
his share toward getting it.

From Mr. Morgan at the
Duckville Gun Club I learned
that there had been a few
sick ducks at Red Rock Lake in
southwestern Montana near
Monsie during the summer.

Yesterday I noted that
Bert Bailey at the Duckville Gun
Club had turned in 50 ducks
while Harry Finch had 56 to his
credit. They had been when the
shooting was very good but
I think killed no more.

October 14, Thursday.

This morning I note that the water gauge at the laboratory registered 2 ft 3 3/4 in so that the water level is about as it was on my departure.

The willow leaves are beginning to fall somewhat now and most of them are yellow.

Numbers of geese are using the flats in front of the laboratory as a roost in the daytime.

October 15, Friday.

Today it was still warmer than yesterday. I spent the entire day at the laboratory in completing various odds and ends of work. Had opportunity of making a few anatomical notes on a snow goose.

Secured several bands from the Bear River Club.

The shooting here continues about as before. The violations over the limit that I see are very slight.

Having so many about ruins my system of note taking to many visitors.

October 16, Saturday.

This morning it was cool and pleasant while later in the day it became quite warm.

I bailed out my rowboat and about 8:30 I towed it behind the launch out 3 1/2. I went out No. 3 and then lost the cut off into 3 1/2.

Four Bluebills came up No. 3 and passed directly over my head. I saw a dozen Redheads in 3 1/2.

To my disgust I found that some one had torn my water gauge from the post on 3 1/2. Can you not imagine why it should have been done.

The water on the flats here was about as I had left it. East Pass and Central Neck are now full and because of the filling of the bays the overflows are a little deeper though the river is about the same. In other words the current or fall in them is less apparent. This is especially true of No. 1.

Below I caught I Island the water seems more shallow than during September. Perhaps the low level of the lake.

has drained the lower bay
somewhat. I found on duty
as far as Slughter Island.
The water has come up
along the west shore as far
as ~~Long~~ Bigelow's Point but
on the east side does not reach
the rushes. When blinds have
been built along the west shore
but on the east side the
shooting is entirely from sink
boxes. I understand that the
Duckville gun has 15 or more
now.

The Bear River Club is
placing sink boxes in North Bay
also. They are making them
of planks and calking them.
Part of them are sink blinds
two + $1\frac{1}{2}$ feet deep and have a
rush island built up about
them.

These Slughter Point I
remained for over an hour.
A small amount of new
growth was showing among
the dead rushes. The mud
at the south side had the
same wit smell of H_2S as
always.

The mud queen had taken
Bailey & Dick Rogers down below
Cable's Island and I could

barely making them out in the
haze at first. And then
lost them. They were at
least two miles ~~through~~ south
of Ladies Island. The mud
boat left me man in a box
and then started across to
another. Before they had left
the first hunter two minutes
I heard him begin to shoot.
It is said that the
Spoonbills come directly in to
the boxes without fear.

Two men were shooting
from a box directly ~~into~~
southward also. The gunshots
from sink boxes have a
singular reverberating quality
that distinguishes them at
once from shots fired in
the open.

Leaving Slaughter Island
I have pushed up as far as
Slaughter Point examining
the Scripps Island as I
went for sick birds without
discovering any. There was
an enormous bank of
Spoonbills and a few Thal
to the southward perhaps
two miles and shooting
down that way was continuous
I reached Slaughter Point
at noon and concluding.

My boat went into the
blind to eat my lunch. A
few birds were coming in
and I remained until four
thirty getting one Mallard
one Gadwall & one teal. Two
other ducks were shot & lost.
A California gull ate one
Spoonbill for one and two
Wigens drifted away.

A man in a sink box
in front of me had fair
shooting. The birds seem
in well to him. Shooting all
over the marsh was almost
constant. The birds on the
water pay no attention to it
whatever. Morgan got 60 birds
today.

October 17, Sunday.

Warm and pleasant again today. Packed up a great quantity of mail packages and got them ready to send off. Was so busy at this packing practically all day. I wanted to go down & examine the Blackbird roost but did not get time. There is a great flight of them every evening now.

I made the accompanying chart of the grounds here today. This eastern end of Section 25 is cut by the river making two loops south of the river that are under fence. I should we get control of the the most southern it could be fenced across easily to shut out cattle. This area was fenced originally to make a pasture for plains cattle. It has cows in it now and they come down about the laboratory causing some annoyance. Most of the feed lies in the next bend above so that fencing this area would cut off my little pasture. The shortest distance across is 35 yards. A more feasible spot for fence lay a little south of this through a

Small open spot of alkali
The length of a fence here
would be 25 yards. The expense
of fencing would be that of
wire and staples. Posts could
be cut in the willows.

I am uncertain as to the
exact area involved. The
distance along the river is
400 yards. The area included
lies between the river and the
fence. I should say that it
covers between two & three acres.

This morning I walked up
along the willows finding the
most abundant birds to be junco.
Six were collected.

October 18, Monday.
Today it was still and
warm again.

I continued my packing
and preparations for leaving.
There are so many little
things to do that it takes
a great deal of time.

I sent a gunny sack full of
packages to Corinne Steadley
and got a great many
more ready.

Wallace Jensen told me
that eight years ago he picked
9,000 ducks at the Bear River
Club and that others picked
6,000 a total of 15,000.

I have figures now that
on the shoot there last year
that at the Duckville Gun Club
that are fairly accurate.

As I have received \$97 for the
season's work and Mrs. Hansen
who remained a few days after
the season closed \$110.00.

20 geese were picked at 10.0	\$2.00
about 50 Redheads & canvasbacks @ .05	2.50
	4.50

$\$97 + 110 = \$207$. $\$207 - 4.50 = 202.50$
 $\$202.50 \div 1\frac{1}{2}\text{¢}$ (price for picking ducks) = 13,500
so that 13,500 ducks were picked.
Counting birds shot and taken
away unpicked and birds
shot by quacks & picked by them.

The total birds will reach well
over \$15,000 for this one club.
Figures for Sackett's and the
Pagan River Club are not available
but it is safe to say that it
is not far below this. Counting
miscellaneous hunters it is safe
to say that not far from
50,000 birds were destroyed last
year on this one marsh.

To this number may be added
one third as representing birds
crippled & lost or birds that
were killed and not found bringing
the grand total to 65,000 birds.

Examined a number of ducks
wings today to determine for
certain that they are diastotaxii.

October 19, Tuesday.

Worked today all day at
packing up.

~~Was invited~~ This morning
I got out at 4:30 and went
out with Si Kudson to try for
geese but got nothing. The
geese roost on the lakeshore
here and about seven in the
morning begin to fly inland
where they rest and feed
on the open flats. In hunting
them hunters watch them
and find out where they are
feeding as the birds will return
to the same location ~~and~~
day after day for a week or
more. When in the morning
early it is the practice to go
out set out some shadow
decoys made of galvanized
iron. The hunter then
digs a pit in the salt grass
or lies down flat in the
salt grass and waits for the geese
to come in. The best localities
are those where barrens cover
with growths of *Salicornia* large
islands of salt grass dotted
over them. This morning two
other hunters beat us to our
location and we had to get in
to one side. They got five but all
but one were killed by guides.

In the evening I had dinner at the Bear River Club. Met a number of gentlemen among them Mr. Mohler. We dined on rare Carroasback.

I worked until shortly on my return getting every thing straightened up around the laboratory. Cleaned up everything, took off the screen door and put it off inside, swept out and pulled all the curtains down. Backed a warning sign on the door to the effect that the building was the property of the Department of Agriculture. I have burned off a narrow strip of grass on either side of the building. All the pens are piled together on the open barrow where they will be safe from fire.

October 20. Wednesday.

Was up this morning at 5:30 and left on the boat at 6:15 for Corinne. Arrived it 8:15 and by strenuous effort made the train. Left a forwarding address at the post-office and sent in a raft of mail packages microscopes and microtome were sent in by express in one box valued at \$350.00. Left Corinne at 9:45 and

after changing at Brigham,
arrived in Ogden at 11:00.

I learned from Frank Larsen
that last year Fred Sharmen
shot and sold 3,000 ducks on
average of fifty birds a day
for two months.

In Ogden I went to the
bank and then had an
amalgam filling placed in a
tooth. Spent the afternoon in
writing. Registered at the
Marion.

Felt pretty tired this evening.

October 21, Thursday.

This morning I went in
to Salt Lake City on the electric
line. Left at 10:00 and arrived
at 11:00 A.M. Went in to see
Mr. Chambers but found that he
was not in. All state offices
are in the new capitol. This
is a fine building and I
spent a few minutes in
walking through it.

Had lunch at Finch & Rogers
cafe and talked for a time
with Mr. Finch thanking him
for courtesies extended by the
Gun Club.

Went in and saw Mr. C.
Griffin. He says that there
is no trouble at the new

Stale and discouraged in
from going out there.

I find that a trip to Oasis
will not pay. Talked with
Mr. Wrathall taxidermist. He
does very good bird work.

Went in to see Mr. ^{A.O.} Soregaye
but found him not in.

Left for ~~Butt~~ at Ogden at
three and arrived at four.

I have ordered a new
suit here and have bought
new shoes etc.

The valley is very pretty here
now. The poplars and cottonwoods
are yellow and when there
are fresh trees the leaves
have turned a beautiful red.

As always the diversity of
the country is pleasing to the
eye after a sojourn in the
great flats.

October 22 Friday.

This morning I rose at
six and then took the
Southern Pacific for Remington Point.

It was clear all day
and warm almost too
warm in fact. First I
filled a jar with orange
the lake and forwarded it
express to the survey. The

bottom here is rocky nearly
every where or sandy. In
some places however I found
a greyish ooze rather sandy
in consistency. I am afraid
that it is pounded on the
rocks too much to contain
either *Amatocytes* or *Orations*.
Then were great quantities of
the algae *Nostoc* sp. washed
in here.

After doing this I walked
back along the east side
of the promontory. There were
hardly any ducks here
this year. I saw one flock
of about thirty gulls gathered
on the beach. On examining
the locality with a glass I
found that a spring issued
there and that the birds
were drinking the fresh water.
Chrysotrachurus was in
bloom as at this time
last year.

I walked out through
the sage brush for some distance
watching for *Amphispiza* but
saw none.

Several swimmers have appeared
up at this end of the Promontory
range since I was here last
year and there is considerable
swimming excitement.

I followed up the first
canyon until I came ^{to} the
spring. The season shows
that it is farther advanced
here than last year. The leaves
are nearly gone from the
maples. These maples grow
here in places twenty or thirty
feet tall and have a girth
of six inches to a foot.

Birds were more scarce than
last season. I ate my lunch at
the spring and various
birds came in to drink. Junco
were common and among them
I identified both meadow &
Shufeldt's Junco. A little flock
of Goldfinches came in and
Chickadees were common.

From here I followed on
up to the top of the ridge catching
grasshoppers. Two species were
common. One had yellow & the
marked wings and the other the
wings. They lay all through
the sage brush and on up
through the junipers to the divide.

The ground high up was
rough and stony. The yellow
& black species was active and
individuals always jumped when
I struck at them so that they
were easily caught. The
blue winged form was

quite many let me pass
without flying and when
I struck at them they
usually crouched and remained
motionless so that they
were hard to get. I
broke the handle of my net
& tore a hole in the bag.
In flight they made a
buzzing zit zit zit zit.
In alighting they dropped
off to one side in the last
six or eight inches & was
hard to locate.

The camps up here were
large. I saw one fifteen
inches through. With them
were trees of another species
with ~~an~~ elongate shiny
leaves a climber like the
shrub ^(Celastrus scandens) and an aromatic
oak specimen taken. Another
plant grew over rocks forming
a dense hanging mat
showing outwardly a solid
mass of rosettes. (*Petrophytum caespitosum*)

Reaching the top of the
divide I decided to go
down & return on the west
side. The distance was
much greater than I had
supposed being at least
fifteen miles. I passed down
through a valley ground with

Sagebrush and finally came out
on the lake shore. Several rocky
points now a hundred feet or
more above the water level of
the lake were polished smoothly
by water. The polish appearing
as fresh as things just done
in places. The shore line was
sandy and a drum had
been thrown up by the waves.
The only bird seen was
one Horned Lark. I shot a
large chipmunk ^{Amnosp. permophilus} ^{leucurus} and
another. ^{Amnosp.} made into skeleton.

Out for fifteen I reached a
flag station known as Saling and
got a train at 6:15 for Ogden.
The lake was beautiful
this evening. In the soft
colors reflected in it by the
sunset. The water was
only with a slight
swell that did not break
the apparent smoothness of the
surface. The sky above at first
was olive green with deep
purple clouds. Gradually it
suffused with a rosy hue,
that tinged the wisty peaks
Hemant, Antelope and Stansbury
Island stood out as dark
purple masses.
The evening air was chilly.
Reached Ogden about 7:15 clear.

up had dinner and then
went to bed.

October 23, Saturday.

Was rather footsore this
morning and did not go
out in the country. Had
enough official correspondence
to busy me during the
forenoon and worked in notes
until five in the afternoon.

Ed Browning had a new
type of ejector put in my
collecting pistol and it
works like a charm.

Made an appointment with
Mr. Chambers in the evening
but his train got in so late
that I did not see him.

Very warm today, almost
uncomfortable in fact. I
thought once of putting on
B. V. D's again.

In the evening Mrs. Van
Meter invited me out to the
Alhambra (Vanderbilt) with the
Bigelowes.

October 24, Sunday.

This morning about 8:30
I went out in the country
following up the Weber River
as far as East Ughden.

It was a fine clear day
with a light north wind
giving a sharp edge to the

Air. The cottonwoods have turned yellow but still retain most of their leaves.

The Weber is about as high now as in the spring. The current is swift and the water clear. Many leaves are carried by the current now. I saw small fish in deep pools.

Birds were plentiful. Long tailed Chickadees were common. Junco of the oregonus & hyemalis types abundant and I saw a sprinkling of Robins, Flickers, Magpies, Goldfinches and others. The new jacket on my jacket works to perfection. The gunsmith who did the work repaired certain rough spots from the barrel and the gun seems to shoot stronger than before.

I saw several Eutamias but could not collect one. I wanted one for a skeleton.

The day was so pleasant that I delayed the thought of returning to town.

Month October 11-28, 1915

Amount available at beginning of period	351.04
Total expenditures	141.62
Balance	<u>209.42.</u>

Food Habit	Cash expense Oct.	48.72
Diet Disease		74.17.

May 6, 1916, Saturday
Left Washington 7:35 P.M. on the
Ber O for Chicago quite warm.

May 7, Sunday.

Was up this morning as the
train came into Youngstown, Ohio.
Leaves on the trees here were not so
far advanced as in Washington. In
most of the grove there was merely
a tinge of greenish brown from opening
buds in the treetops. Symphoricarpos
was in full ~~leaf~~ as was Craegus
in the pasture. There have been
heavy rains all through here; the
grass was fresh and green from the
abundant moisture and water was
standing anywhere. West of Akron
vegetation was farther advanced
and leaves showed in the treetops.
Saw some oaks that were leafing out.

In several places I saw
muskrat houses in little swales
~~not~~ from 30 to 40 feet square that
were not connected with any stream.
I was surprised to note them in
such small quarters.

Red-wings were fairly common and
I saw numerous Sparrowhawks, Marsh Wrens,
Crows, Robins and Mourning Doves. Heard
Bag Sparrows singing.
Saw one very large Mosquito -
Burton. Chrysomelids were common.

At Willow Creek, Indiana, when the train stopped for a few minutes I heard a mockingbird in full song and saw a Cowbird, several English Sparrows and heard a yellow Warbler.

Near Gary, Indiana we passed through a sand dune region with alternating sandhills and small ponds and swamps, lying south of Lake Michigan. This area was interesting because of the work done here by Chicago naturalists. In several places I saw growth of low scrub pine. The road ran immediately along the lakeshore for some distance but I could see little because of a haze that hung over the water. The breeze from the north was cool and fresh.

Reached Chicago at 4:40 P. M. Grand Central Station. Transferred to the Dearborn Station. Left Chicago via the Santa Fe at 6:00 P. M.

May 8, Monday.

A heavy storm passed over last night. This morning outside Kansas City I heard numerous Dickcissels singing as always here.

Vegetation seems much farther advanced than it was at Washington though of course ~~the~~ it is two days later than when I left. This

country and in fact eastern Kansas
seems dry and in need of rain.
left Kansas City at 9:10 and arrived
at Lawrence at ~~9:40~~ 10:22 on the
Santa Fe. Scott H. & family were
there to meet us and we were soon
out in South Lawrence.

Saw Scott Grisco at noon and found
that he would be able to join me at
Corinne on Thurs 5. He seems pleased
at the opportunity for the work.

Went to the University at 1:30.
Bunker told me that Vic Householder
had gone to Southeastern Kansas to do
economic work on the cotton rat, heard
nothing more concerning the status of
the animal.

Called on Mr. Noble Sherwood at
2:00 and remained with him until
4:30. He told me that two or
perhaps one or two more of the sick
Chicks from Great Bend had been
brought in to the University frozen
for examination and that work had been
done on them by Professor Clausen and
two students. As I talked with
Professor Clausen also, the following
is a composite of information gained
from ~~them~~ both these men. The Chicks
were said to die frozen in in the "
ice with" heads under their wings.
Careful examination revealed no lesions
in the internal organs except

possibly in the spleen. The intestines
seemed normal. Professor Clausen
remarked however that he was not
familiar with the appearance of
Duck viscera when normal. On
skinning the birds they found
hemorrhagic lesions between the
skin and the body in several
places. The species of duck examined
was not known to those who did
the work. Professor Clausen found
in these hemorrhagic lesions an
avirulent organism and succeeded
in isolating it also from brain,
liver, spleen and kidney. That the
organism found appeared avirulent.
Intracerebral inoculations made from
cultures had failed to prove positive.
In fact the cultures seem wholly
innocuous. However from this form
they seemed capable of inducing
an encephalitic trouble. Prof. Clausen
admitted that his results were
tentative and said that only the
examination of further material would
tell whether he was on the right
track or not.

Dr. Sherwood was much interested
in my account of conditions at
Great Salt Lake. He after careful
consideration said that apparently I
was on the right track in suggesting
a chemical poison as the cause.

Although the ocular discharge
might indicate some septicæmic
condition still this same discharge
might be caused by something else.
He gave me suggestion that caught
my attention when he said that
Magnesium sulphate was very poisonous
to dogs in which there was a
previous severe intestinal irritation.
So that administering Sodium
chloride followed by Magnesium
sulphate might prove fatal. Examination
of nerve centres controlling wings &
legs might prove fruitful also.

While at the University I
called also on Professor Baumgarth,
and Mr. Haworth. I spent half an
hour in the museum.
hooked up the type of Formicarius
monilegis pallidus Lawrence. This
is indicated as the type specimen
on a list prepared by G. H. Lawrence
himself. On the same list
Leptoptila fulviventris is
indicated as a type but this
specimen has never turned up.
I think myself that it was
destroyed by moths. I remember
fragments of such a fragment in
one of Mr. Brown's cases.
I seemed very good to be
about the museum and the
campus again. The view across

Wakarusa valley as always was beautiful.

Shortly after five we drove out along Little Stranger Creek and back ~~home~~ supper is the coming hour. There is at present a great host of geometrid larvae attacking the newly leaved elms. The tender growth on some trees has been entirely eaten away and other trees have limbs or perhaps the entire top almost stripped of verdure. The larvae hang down on long threads and creep on pedestrians. The sidewalk is littered with them. English Sparrows were feeding on them greedily. A Saw Robin, Baltimore Oriole, Rose breasted Grosbeak, and Bronzed grackle eating them. Other birds noted in the infested treetops were the yellow-billed Cuckoo, Yellow Warbler, Tufted Titmouse and Brown Thrasher. This is a very interesting thing and I wish that I had more time to watch it. Birds are very abundant in the rows of shade trees lining the streets and I believe are attracted here by this abundant food supply.

May 9. Tuesday.

This morning was up at 4:30 and met Charley Bunker at 5:00. He drove out in a Buick and we did some collecting. First we turned down past Reynolds and then down the little body of timber near ~~Holt~~ Kump on the Wakarusa. There are myriads of birds in the tree and shrubs of the town. At daylight they were especially noisy. The old tangle of hedge and brush below the "Dog farm" had been nearly all cleared away. In a little corner of it I collected a Yellow and a Black and White Warbler. Rain threatened for a time but soon passed over.

In Armstrong's timber the canker worms were at work on the newly leaved elms. Their webs spun long and slender threads being everywhere catching on my face and clothing. Many of the small trees were being stripped. I learned that they had appeared about two weeks ago and that they had been steadily growing worse. Birds abounded there in this patch of timber and I believed that most of them were feeding on the worms. 21 birds were collected for their stomachs. These taken were Kingbird 1, Orchard Oriole 1, Dickcissel 2, Clay-colored sparrow 3, Field Sparrow.

Bell's Vireo 4, Tennessee Warbler 4, Yellow Warbler 1,
Black & White Warbler 1, Wilson's Warbler 1, Chickadee 1,
Ruby crowned Kinglet 1.

Other species common were the following
arranged somewhat in order of abundance.
Cowbird, Baltimore Oriole, Catbird, Crested
Flycatcher, Red-headed Woodpecker, Brown
Thrasher, Wood Pewee, Least Flycatcher,
Chat, Red-eyed Vireo, Bobwhite, Crow,
Hairy Woodpecker, Rose-breasted Grosbeak
Cardinal, Yellow-throat, Yellow-billed
Cuckoo. These birds were very
active in the tree tops where
the birds were abundant.

I was very sorry that I did
not have more time to spend here
as three or four days could be
passed profitably in studying
the birds in relation to this
insect outbreak. It was with
reluctance that we returned to
town at seven.

The country here is beautiful
and green but is in need of rain.
The sun early in the day was intensely
hot.

In town I packed my suitcase
again and prepared to depart.
Had time merely to sweep once
in the grass of the back yard. Several
small Hymenoptera, Diptera, & flea-bitten
etc were collected. I secured two
Megilla maculata but did not preserve

them. A few brownish colored things
were in the suit. Last night I got a
few more from a buffalo feed.

~~learned that~~ Left Lawrence via the
Santa Fe at 10:22 purchasing a
ticket to Great Bend Kansas.

Met "Red" Burt of culinary fame in
the Acacia House on the train and
had a pleasant visit with him.

His brother Lloyd Burt of Hutchinson
Kansas who was with him told me
something of sick ducks near Ellinwood.
He said that great numbers were reported
dead but knew nothing more about it.

The country from Lawrence west
seemed sadly in need of rain and vegetation
was less advanced than at Lawrence.
Burt said that the country along
the Rock Island near Herington was
famous for flocks of Blackbirds in the
fall. Dickcissels were heard as far
west as Emporia. Birds seemed
rather scarce.

Reached Great Bend at 7:20
and registered at the Hermann Hotel.
Very hot with a warm wind
tonight.

May 10, Wednesday.

Woke this morning at 6:30. ~~Had~~
It was my plan to get out early
and go over along the Arkansas
River to see what birds were about.
During the night a severe wind storm
came culminating about day break
in a gale in which the air was
filled with sand so that I
remained in. After breakfast I
walked down to the river where
a new cement bridge crossed it.
The stream was shallow with
a broad sandy bed through
which ran a narrow channel
of fairly clear water. Cottonwoods
grew along the stream every where.
Because of the wind few birds
were in evidence.

Yesterday it was uncomfortably
hot so that I sat in my underclothes
while writing but this morning
I found that the wind had
shifted to the north and ~~and~~ bringing
a bracing coolness that was
very agreeable.

About 9:00 I called on
Mr. C. D. Spangh, 1203 Main Street a grocer.
The sportsmen of Great Bend have
organized a gun club known as the
Great Bend Sportsmen's Association and
have leased the hunting privileges for
the western side of the Cheyenne Bottoms.

There they have a clubhouse and other buildings. Mr. Spangh is president of the organization. about 40 members now. Mr. Spangh said that there had been a good many sick ducks in the Bottoms. Pintails were the species most affected with a few green-winged teal and shovellers. But the Bottoms the water on the east side is shallow while on the west it is deeper. The sick birds were all found on the east side in the shallow water. Only a few birds were noticed until after the freeze in January when many were found. Probably thousands. Mr. Spangh admitted that there were sick birds and believed that the trouble was due to their crowding in shallow water. He had seen very few sick birds personally.

Some others believed that the birds had died from lack of food but he hardly thought this possible.

A cyclone passed through this region on November 10 and some said that this had killed many ducks.

For four or five ~~days~~ years it has been very dry on the marsh but last year water filled it again.

Next I called on Mr. Charles Herriman proprietor of the Herriman Hotel. Mr. Herriman would not admit that there was any disease among the ducks. He attributed the dead birds

found to cripples from shooting. The cyclone also passed through the marsh going between Claflin and Redwing and this in his opinion killed many ducks. Mr. Hermann has three Pintails and several mallards that were brought in from the marsh. The mallards are laying.

He said that last year he killed about 50 ducks. He favors spring shooting until March 15. He says that in most seasons the marshes are dry in fall and only in spring is there water to attract ducks. Very few ducks were found along the Kansas River. The gun club has the shooting privilege on the bottoms for the next four years.

Following this I saw Mr. E. W. Seward a barber. Mr. Seward was very conversative and well informed regarding the situation. He had seen many of the sick and dead birds. He said the birds became so that they were unable to fly or perhaps could fly only a few yards. These birds were pitifully thin and emaciated. He had noted no discharge from the eyes or nostrils and said that in birds fresh caught that the feathers about the anus were clean. He brought in twenty-two live birds but all of them died save two. These two he thought were

cripples. He said that all the birds were found on the eastern side of the bottoms. He thought that many of those found frozen in bunches in the ice had been washed in by the wind.

He introduced me to Mr. G. E. Dirks a photographer. Mr. Dirks had seen the birds on the eastern side of the bottoms and was convinced that for a large part some disease was working among them. He told of seeing birds drop out from flocks in the air but this I do not believe. However he showed me a negative by Mr. Geo Klein of Ellinwood in which 52 ducks could be seen. He said that he would make me a print of this. They found numbers of birds frozen in the ice after the freeze up in January. Some lay with outstretched necks others had their heads under their wings and were sitting up frozen solid. Sick birds had the feathers about the anus stained with excrement.

Here too I met Mr. Clyde Moore who had been out with the party that had looked into the matter after the freeze up. He substantiated Mr. Dirks' remarks. Ducks were said to have been frozen into the slush ice in numbers. As a common name for the Buffle head he gave "Brogey". a

Names by which these ducks
were known to the market hunters.

With him I met Mr. C.
M. yes register of checks but learned
nothing additional.

Called on Mr. S. M. Killam
clerk of the court a very dogmatic gentleman
and with him met Mr. R. C.
Russell County Attorney. They
thought the number of affected
ducks greatly exaggerated and
were not inclined to believe this
trouble a disease.

All of these men were arguing
for spring shooting for the month
of February at least and all
seemed to have a dislike to Holland.
They said that he had misrepresented
statements made to him and had
published accounts in which he
had belittled this information.

He told me too that Geo. J. Klein
of Ellinwood was well informed but
that he was given to exaggeration in
talking. Klein has a place at the
edge of the bottoms and captures
water fowl to sell for propagating purposes.
It is said that he has cured some
of the sick ducks with fresh
water and forced feeding. He lives
16 miles from Great Bend.

From information it seems
certain that some disease broke

out among the water fowl perhaps
in November. Numbers of ducks
mainly Pintails with a few Mallards,
Shovellers and Green-winged teal died.
Others were weakened so that they
were unable to withstand the
severe cold of a January freeze.

Certainly over 1000 ducks were
lost probably two thousand or three
thousand. The trouble terminated
in January or early February.

Nothing is known of it this spring.

Under the circumstances I
do not consider it worth the
time and time expense necessary
to make the trip out to Cheyenne
Bottoms. The high wind of yesterday
continues and I am told that
this would make travel in
the marsh difficult because of
the waves. The Bottoms are said to
be approximately 6 miles wide by 12
miles long. There are no springs the
only water reaching them being
surface water from heavy rains. This
floods the entire area. As it subsides
smaller lakes are left. The bottom is
said to be muddy and covered
with marshy growth. On some
summer the water is covered
with aquatic growth.

About three I walked down
to the Arkansas River and crossing

it went east along the South
Bank for a mile and a half
collecting a few insects and watching
for birds. Along the stream were
willows and groves of cottonwoods.
This whole country here is
under cultivation and is in
to wheat. I did not see
any unbroken prairie land while
here at Great Bend. Along the river
I came to see two or three
sandy knolls five or six feet high
that were covered with low
plum brush and grape vines.
But this was the only sign
of original vegetation outside of
the willows and cottonwoods.
This great change from original
conditions must have created
a great influence on the bird and
other animal life of the region. Species
accustomed to a prairie habitat would
in certain cases become extinct. This
would without question influence the
longspurs and probably the Horned
larks. Birds were fairly common
however. I found few insects.
The country in which I was
collecting was too dry for them.
Returning to Great Bend I purchased
a ticket to Ogden Utah rate \$27.05.
Mr. G. E. Parks the photographer
gave me two prints from a

negative of dead chicks on the
Cheyenne Bottoms. This photograph was
taken by Mr. Geo. Klein of Elwood
as it then are supposed to be
52 dead birds. These seem to be
Pintails and a few Mallards. Nearly
all seem to be drakes. From the
positions in which they lie they
seem to have drifted in here by
the wind and then to have
frozen in the ice. Mr. Hirk said
that they had been frozen in some
heavy ice which had thawed
releasing them and these subsequently
had been flooded. The birds were
frozen in the upper coat of ice.
Mr. Hirk said that at Redwing
there was no hotel but that I
could without question obtain
lodgings at with Mr. Brockel a
prominent man there. This town
would be a good point from which
to work the marshes.

Mr. Hirk said that the Kansas
sportsmen objected to men in the
State south of them shooting during
February while in Kansas they were
prohibited from hunting. He said that
if they might leave until Feb. 15
they would feel better about it.
Left Great Bend Kans. for Denver
at 7:25 via the Santa Fe.



Dead Pintails and Mallards on ~~river~~ side of Cheyenne
Bottoms at Great Bend Kans. Feb. (?) 1916. Photo by Geo J. Klein, presented by
A. C. Dicks.

May 11, 1916, Thursday.

Ate breakfast this morning at Colorado Springs. Afterward I called up D. P. Warren. He is planning a trip to Cheyenne Wells, Colorado to observe bird migration. He wanted me to stop but of course that was impossible.

Between Colorado Springs and Denver I saw numbers of Magpies. One Crow was noted near Sedalia.

Reached Denver at 10:00 a. m. checked my baggage, secured a Pullman berth for Ogden and then went over town.

Found that R. B. Rockwell had set up in business for himself. But took me out to the Colorado Museum in his car and I met the Director Mr. J. D. Higgins. I found him a tall spare man with dark hair and mustache and a very pleasant manner. The groups of birds and mammals that have been installed which small are excellent. The synoptic series seemed to me rather weak. The old cases in vogue when I was here were changed entirely. Fred Lincoln was in Arizona so that I missed him. Had a pleasant talk with R. J. Medrard.

again and Chamberlain promised to send another man to investigate. Now Bigelow has directed Vince Davis to throw a fence across the marsh from the River at the head of No 4 across to the Lake near Swinford's Point.

May 13. Saturday.

This morning I was up at 6:30 had breakfast and left for Salt Lake City at eight. The air was sharp and cold ~~and~~ the atmosphere was very clear. The morning sun threw the Promontory Range and the islands in the lake in bold relief. Fremont and Antelope Islands stood out sharp and clear above the blue water of the lake. Beyond them to the south was the Oggarah range with snow still in its peaks. ~~The~~ fields and orchards showed evidence of the heavy freeze of a few nights ago. Peas were frozen to the ground. Ryeplant was withered and many fields of alfalfa were severely affected. Leaves on some shade trees were hard & frozen and I was told that nearly all of the fruit had been ruined. Birds were abundant along the rocky line. English Sparrows and Robins predominated in the fields.

And other species were often in sight.

There was an abundance of water in the Weber River and elsewhere. Water was running in small streams. Snow lay in banks on the peaks of the Wasatch range.

On Salt Lake City first I purchased supplies at Schramm-Johnson, Drugs, Min & Smelter Supply Co and the Durbin Surgical and Dental Supply Co. Called on Harry Finch. He has recently been at the Duckville Gun Club and reports things in good shape. There is an abundance of water everywhere. He says that calves of large size have gone down with the fresh water close to Badger Island.

I asked him about the cattle on the marsh and he said that he saw few. He says that Sackett asked to lease the section belonging to the Duckville Gun Club that he might pasture cattle on it in exchange he would grant a right of way through his land for the channel of no. 4. Davis also wishes to lease the eastern half for pasture but says that he will keep the cattle off until after the ducks were through nesting. Finch decided that it was better to keep out of it.

He said that Davis had asked him to help in preventing Sackett from running a large herd on the marsh.

Finch was out on the lake about a week ago and visited the rookeries. Large numbers of California gulls and Pelicans and a few Great Blue Herons nest on Hart and Jennison's Island. On a small rock at the north end of Antelope Island were Cormorants and large numbers of G.B. Herons. No Caspian Terns. All of these birds had eggs and a few of the Pelicans' eggs had hatched. The gulls destroyed large numbers of Pelican eggs when the pelicans were frightened away. He saw one sick pelican, an adult that was unable to stand.

Arranged to rent two rowboats of the Duckville Gun Club at \$5.00 per month. Payment is to be made to W. J. Benson Treasurer.

Called on Mr. Chambers' office (State Fish and Game Commission) at the Capitol but found that he was out of town. His secretary told me that Davis had reported 300 to 500 head of cattle on the Bear River marshes. James Kunder Deputy Warden was sent up to investigate and after talking

with Bosly, Cook and Sackett reported no more cattle than last year.

Called at the office of Mr. L. B. McCormick and found that he was out of town. After dinner I called on Mr. M. G. Kysar but found him out also. Had some necessary dental work attended to purchased more needed supplies and then left for Ogden at 5⁰⁰ P.M. Arrived at 6 P.M.

The air was sharp and cold tonight. Called Joe Cook on long distance and arranged to have him meet me in Corinne Monday morning.

May 14, Sunday.

This morning at 7:30 I went up Ogden Canyon with W. H. Neal. We left the Stetley car at the Lime Kiln and climbed up Coldwater Canyon. The air was sharp with a cold wind. When occasional clouds obscured the sky it was very cold. In the afternoon heavy clouds swept across the sky and from then until five there were occasional flurries of snow. At the mouth of the canyon the vegetation was practically out but at about 8200 feet the highest point that we reached buds were barely starting. Between these points was a gradual

Transition from summer to the
earliest indications of spring. Even
these hardy mountain shrubs and
herbaceous plants showed the effects of
the severe frost and freeze. Solomon's
seal was withered in many places.
Service berries and mountain maple
were touched and higher up many
of the willow blossoms had been
blasted.

Beetles was common and in
blossom. A sunflower like plant,
Solomon's seal, service, very were blossom.
High up a beautiful yellow Dodecatheon
was in full blossom and was
scattered every where where the ground
was free from snow.

Because of the cold few insects
were found. A black thrips (Frankliniella)
was common in the flowers of all the
plants. I collected a few Carabids under
bark and rocks in moist localities. In the
afternoon a warm valley bathed in sunlight
for a few minutes. Gave me one Bremus
one Andrena, one Urania and one nomada
at willow blossoms. Some old flies were
secured here also. Had the weather
been better these willows would have
yielded much more.

Birds too were scarce. Above
7500 feet in the coniferous growths I
did not see one. Below were a
few Virginia's Warbler and an

occasional Ruffed grouse. The only
bird taken was a small Empidonax.

The higher slopes had been
logged off until only trees of
small growth remained. The slopes
here were exceedingly steep.

Sometimes during the winter a
great snow slide had swept down
through the canyon clearing everything
before it. Conifers and Mountain
Maples ten inches through had
been swept down and broken
off short. The bottom of the gulch
was filled with snow packed
hard as ice. The debris left by
that portion already melted
covered it until it seemed like
solid earth. Everywhere its surface was
covered with pine needles.

Mountain maples grow here to
a height of fifteen or twenty feet
and are ten inches through. I
saw ~~one~~ few mountain mahogany
(Cercocarpus intricata) about 6,000
feet. Kinnikinnick in places grew up
two feet high in long fronds.

There was an abundance of water
in Ogden River.

Shot one Citellus and found a dead
coyote.

May 15, Monday.

This morning I left Ogden on
the Oregon Short Line for Corinne, Utah at
9:30. The air was still sharp.

but it was much warmer than yesterday. Changed cars at Brigham and arrived at Corinne at 10:30.

I found that my microscope and alcohol had not come on the train though I had seen them on a truck at Brigham so that we had to wait until the Keltum local came. On this they arrived.

Saw Mr. Clarence Odrey in Corinne.

Bought various needed supplies in Corinne. an axe, etc. gasoline has gone up to 30 cents per gallon.

Hired Ray Bosley for the season as field assistant at \$50.00 per month and board.

Joe Cook was up in the Cañon to put me and after dinner in Corinne we started down the river. Our load was big and very heavy but we got along without any trouble.

Left Corinne about 1:00 P.M. and reached Duckville about 2:00. Stopped en route at Fred Hansen's.

There were about the same number of ducks on the river as last year on my first trip. I counted the following pairs

Pintail 3
Spoonbill 6
Mallard 4
Cinnamon Teal 60
Gadwall 16

Green-winged Teal 2
Canada Goose 1

At the Duckville gun club I found everything in excellent condition. At the laboratory a bottle of distilled water and a bottle of ~~sulphuric~~ carbonic acid had broken during the winter. Everything else was as I had left it. The acid smell permeated the entire building. Numbers of wasps and flies lay dead on the floor. ~~It~~ was interested in noting that the curtains down all winter had faded out in the strong light to a pale green.

We got things unloaded from the boat and under shelter but did not make any attempt at straightening and arranging as it was too late in the evening.

Es Sackett came up in the evening and I arranged with him to do some carpenter work for me. Have planned to build a six foot "slope" on the west end of the laboratory. He figured the lumber for it this evening. Mosquitoes were quite bad in the salt grass. I hung the screen door on the laboratory first thing that I did.

The grass is still brown on the flats and all vegetation is far behind what it was last year when I arrived (May 19). The late season will account for this. I think too

that the willows have been affected
by the freeze of the last few days.
The river is running at about normal
high water.

May 16, Tuesday.

Was out this morning at 6:30.
Thermometer $36^{\circ}+$ The morning was
clear but in the afternoon it became
hazy and clouded up. There is a
storm brewing. I expect rain in about
two days.

Worked at the laboratory until
about three o'clock and got everything
unpacked and put away and
the building swept out and
cleaned. The floor was covered
with dead wasps and Blue bottle
flies. Set up the stove pipe and
got the stove in shape for cold
weather. We will need heat from
time to time until the middle of June.

About three we went down
 $3\frac{1}{2}$ in the launch. The water was
swift and deep but there was
hardly as much water in the
flats as I had expected. We
got down as far as the first
island and there was bare
ground for some distance below us.
There is not as much ground
under water here as when I
came two years ago. I believe that
the two dry seasons have made

in building up the bays by drying out the high portions and making them more firm. The vegetation that has started also has ~~started~~ helped render these parts firm.

From the ranch I counted 8 horses and 60 head of cattle below Sacketts. In addition 8 young calves are feeding opposite the laboratory.

All vegetation was very backward along here. I saw only one willow that was beginning to throw off cotton.

Between the gun club and the first island in $3\frac{1}{2}$ were the following pairs of ducks.

Mallard	2
Gadwall	3
Cinnamon Teal	15
Redhead	16
Spoonbill	3.

From my observations of this year I am convinced that migration among the small land birds here at the mouth of Bear River is much later than I had supposed.

Evidently they are just beginning to come in. The Kingbirds have just arrived and are not yet common. They must reach this region from the north, following down Bear River. None of the small

Empidonax are here yet and the
Warblers have just come.

Spent the evening at the laboratory
in straightening out my notes.

May 17, Wednesday.

Temperature at 6:30 a.m. 52°F

This forenoon I worked at the laboratory on notes and on official letters. Have every practically ~~as~~ arranged and in order in the way of supplies. Went ~~of~~ saw the lumber bill for the addition to the laboratory and also figured on lumber for additional experiment pens. Packed up some insects and miscellaneous material to send in.

After dinner Joe Cook and I went up to Kneeland's in the launch. Cook keeps a Ford runabout there at Kneeland's and we went in to Corinne in it. The distance by road is about twelve miles and in this manner of travelling there is a great saving of time. We reached Corinne at 1:45 and went directly to the lumber yard. Ordered lumber and similar needed supplies. It will cost more to paint the laboratory than I had figured. At least three gallons of paint at 2.50 per gallon and two quarts of white lead will be required.

I bought 70 rods of barbed wire in Corinne for fencing and various other supplies.

On the return we stopped at the Chesapeake and I met the Superintendent of the grounds Mr. Miller.

The gun club there owns about 1800 acres of ground and has leased the shooting privileges on an additional area. Formerly Woods Creek ran down through there and emptied into the eastern end of North Bay. About 15 years ago Mr. Harvey organized the club threw a dam across Woods Creek and in addition by purchasing this property from the Sugar Company secured waste water from the Bear River Canal. This with the water from Woods Creek filled a large area making a shooting property. At ~~low~~ high water from Woods Creek took out the dam several times until finally a ditch was dug through surplus from it into the river again.

At present water at the dam is 32 inches deep and about 1800 acres are flooded. This water is 3 or four feet deep in the middle during shooting season the water at the dam is lowered to 16 inches this makes a supply of food accessible to the shallow feeding Ducks. The lake then covers about 1000 acres.

Much warmer today.

May 18, Thursday.

Thermometer this morning stood at 52°. Much warmer during the day. The sky was overcast all day with rain threatening. Cook went in to Corinne today with the big launch and the flatboat after lumber. I sent Bosley along to attend to lumber that is coming down for me.

Mosquitoes are quite bad now. In the morning I went up along the willows for an hour or so. Found a small flock of Lark sparrows and Chipping Sparrows that are evidently migrants. There are a few Indigo Bun Warblers and Pileolated Warblers in the willows. Heard the first yellowthroat singing today.

Collected three young magpies and worked on them until noon.

This afternoon I made out my expense account to date and then made an estimate of running expenses until July 1 so that I might know where I stood in the way of available money for incidental expenses.

Towards I fixed up the water guage. Figures on it had been nearly obliterated during the winter. The guage at 1 ft. 7 in. the water

has gone down 3 inches since Monday. During the spring water stood at the 1 foot mark on the gauge for a long time as it was well cased in mud. At some time struts had stood at $5\frac{1}{2}$ inches.

Cook and Bosley came with the lumber about seven thirty. A storm was brewing so after dinner we unloaded the flat boat finishing the work about 11:20 P. M.

Bosley made the following count of ducks seen between the laboratory and Corinne.

Gadwall	22 pairs
Amiazon Teal	78 "
Spoonbill	21 "
Mallard	14 "
Pintail	2 "
Ruddy Duck	1 "

This count was made in the forenoon which may account in part for increase over min.

May 19, Friday.

Water gauge 7:30 a.m. 1 ft. 7 inches.

This morning first thing we checked over the bill of lumber. Found one or two things short and some other matters that will need straightening out. Made out a Form 5 voucher for the entire amount that I may have it ready when I go to Corinne.

After dinner we went down Channel 1 in a row boat.

About three it began to rain and we returned. I noticed a

peculiar phenomenon in regard to rain that I have seen here often before. Storms with rain extended clear around us shrouding Little Mountain, The Promontory Range, the islands in Great Salt Lake, Willard Mountain and the Wasatch in mist and rain while in the center of the valley with the mouth of Bear River as a center there was no precipitation. Often I have seen these storms clear off with no rain here at the laboratory at all.

The water now in Salt Bay is not much higher than when I came last year though there is about five inches more water in the river. The vegetation and in fact the entire season seems very

backward to me.

The following pair of Ducks were seen
between the laboratory and Pintail
Neck in No. 1:

Cinnamon Teal	10
Spoonbill	1
Redhead	6
Gadwall	2
Pintail	2
Mallard	1

The nest of a mallard containing
11 eggs was found.

There is a great colony of
Avocets and quite a few stilts
down here.

No sign of sick ducks. I
have heard that there were quite
a few sick Bluebills in the Chesapeake
this spring. would ~~surely~~ attribute
the trouble to lead poison.

Backitt on whom I am depending
to build the addition to the laboratory
phoned me that he could not be
there until Tuesday.

May 20, Saturday.

Water gauge at 8:00 a.m. 1 ft. $7\frac{1}{2}$ in.

This morning we went out Channel $3\frac{1}{2}$ in the launch and then down along the west side of South Bay as far as Slaughter Point. Last night there was a heavy rain up the valley. This morning the wind was northwest and was cool. The sky was overcast during most of the day.

Between the laboratory and the mouth of $3\frac{1}{2}$ the following pairs of ducks were seen.

- | | |
|-------------|----|
| Pintail | 1 |
| Common Teal | 21 |
| Redhead | 12 |
| Gadwall | 3 |
| Mallard | 1 |
| Spoonbill | 1 |

This will serve as a check on the count made here previous to this.

From the mouth of $3\frac{1}{2}$ I walked straight down the west side of South Bay. There is a broad band of Cat tails here ~~the~~ alternating with growths of *Scirpus*. At high water this is all flooded. Now there are small pools from a yard or two to several hundred yards wide and runs and beds of water all through. This is a great Harboring place for

Ducks. Between the mouth
of $3\frac{1}{2}$ and Slaughter Point I saw the
following pairs of ducks

Redhead	120
Canada goose	13
Green-winged Teal	13
Ruddy Duck	5
Pintail	13
Cinnamon Teal	20
Gadwall	9
Mallard	9
Spoonbill	12

A few Pintails and green-winged
Teal were in small flocks on the
bay and one flock of 4 drakes each
of mallard and Spoonbills were seen.
These birds are not settled yet and
were ignored in the count. From a
blind below Bigelow's Point I counted
68 pairs of Redheads in sight at once.
Potamogeton was out an inch
or two long.

I found one muskrat house
that was $3\frac{1}{2}$ feet tall and six
feet broad. another was 3 feet
tall six feet broad and 12 feet long.
It formed a long slope with
the highest Point on our end.

There were many Sanderling
and Black-bellied Plover on the bay.
This is the first time that I have
seen the former here.
At the wharf on Slaughter Point.

I collected one male Redhead
here and plucked it for use
as an alcoholic. Was surprised
to find a claw on the pollex.

Pana pipiens was seen in the
marsh and I found a few
tadpoles.

Chironomids were abundant
but there were few mosquitoes
down here. I saw mosquitoes
bite young Great Blue Herons several
times.

Found no trace of sick ducks.
Though the water in the
river is higher than last year
at this time, there is more
mud exposed in South Bay
by far than when I came
last year. This must be due
to the fall in the general lake
level. This fall would drain
these flats much more rapidly.
The river current is strong
and as usual is heavy with
finely divided sediment.

May 2nd Monday.

Thermometer at 6:30 A.M. 40°+

The forenoon was clear but cold. After noon the sky clouded and was alternately cloudy and clear until 6. In the evening the sky cleared but a cold north wind blew that was piercing. In the laboratory I lighted a fire in the evening.

So Sackett came at 8:00 A.M. and we began work on the store room for the laboratory. The building was up clear for the rubberoid roofing and the window by dark. It had it built 6 feet wide and twelve feet deep. It has one small window and a large door. The underpinning is strong and the building will make a convenient storeroom. Boots, clothing and miscellaneous matter that now covers space in the laboratory may be put out here.

Worked here all day.

Sackett tells me that he is running 93 head of cattle on the marsh now. Between 30 and 40 are herd cattle that he is keeping for others. In addition there are eight head of horses. He will bring down water milk cows later on.

May 23, Tuesday.

Temperature at 6:30 A.M. 40° F.

Rather cold and disagreeable until noon. Then it warmed up somewhat and a curious heavy haze filled the valley obscuring the mountains. It seemed to threaten rain but nothing came of it.

Numbers of Cliff swallows and a few Violet green Swallows were about the laboratory in the morning. Bosley shot two male Purple Martins in the morning.

The storeroom was completed today and the doors hung.

I put the new screen door purchased this spring on the laboratory. Shifting the stool me to the storeroom.

Bosley tarred the joints over most of the roof over the laboratory.

Saclett worked until two P.M. and then left for town. He had some work haying at Honeyville and will finish for me when he returns in a few days.

Cook went in to Corinne this afternoon and brought out the mail.

May 24, Wednesday.

Temperature this morning 40° .

A strong wind came up during the night and continued during the morning until after noon. Until 10 there was a cold driving rain and during the forenoon the temperature did not rise above 46° . Heavy snow fell on the Wasatch range and when in the evening the sky cleared the peaks were white down to about 8000 feet. Willard mountain was beautiful. ~~and~~ immediately after sunset it stood out bold and clear with all the gulches and canyons sharp cut and strongly defined. The summit was white with snow while across the whole ran the zigzag band light in color that I can tell marks an exposure of quartzite.

About nine I went out in the rain to see what birds were moving; the appearance of a female *Dendroica nigrescens* and scattered *Pileolated* and *Dendroica* warblers in the willows in front of the laboratory windows seemed to indicate a migration wave. Though the wind was driving the rain across the flats in sheets, in slicks and hip boots I was

was warm and dry - saw
when the wet put in on the
back of my hat between cap and
shirts. ~~the~~

In regards to small birds,
I was disappointed. A few Audubon's
Warblers, an occasional yellow and
Pileolated and a stray Empidonax were
the only birds in the willows. Stray
Snow Terns drove across the
skyline and two were collected.
Olbis and Nigrit Terns beat back
and forth and pairs of ducks
drove across. The birds in the
river seeming to enjoy the chilling
weather.

Until noon there was a
steady movement of Swallows
down the river toward the flats.
98% at least were small Zachyrinta
t. lipida. An occasional Cliff Swallow
and straggling Purple Martin made
up the rest. They came in
small bands of half a dozen to twenty
five, driven by the ^{south} wind to
skim along the surface of the water
between the willow lined banks
or to beat along behind the
protecting fringe of brush on the
north shore. & winging back
and forth across the salt grass
mud rising more than twenty
thirty feet in the air I thought

there was no end to them.
Hundreds passed in all bound
for some haven in the great
flats below.

These birds all showed bodily
depression due to the cold and
also probably to lack of meat
giving food. Body temperatures of
2 male Violet green swallows registered
 103.8° and 106.8° . A female Dendroica
magister 105.4 , a female Dendroica
auduboni 105.6 . In the evening
two Purple martins registered σ 104.8
 f 105.0 . Other temperatures would
have been recorded had not a
wing tipped martin snapped the
end of my thermometer in his bill
while I was collecting before noon.

About then the sun shone for
an instant or two and the Violet green
swallows martined by the light
began bathing by dipping into
the tops of the swallows on the
river. As each one struck with
a plainly heard splash he
submerged the entire under half of
his body and his head, while
his wings were held high above his
his back.

Toward evening all these
swallows returned and hawked
about for a time high in the
air or later swimming barely above.

the grass. at dusk in little
flocks they sought the shelter of
the willows, to roost.

I worked on notes and specimens
at the laboratory all the afternoon.
Am putting up numbers of small
birds as albatrosses.

Cook fixed up my newfangled
cooker in final shape and I
put in a little time in trying it
out.

Intensely cold in the evening.

May 25, Thursday.

40° This morning the thermometer registered at 6:30 and the air was very sharp and cold. The sun shone during most of the forenoon but in the afternoon a strong wind came up from the north and it was exceedingly cold so cold in fact that I had to kindle a fire.

In the forenoon we went up the river and out Brown's Overflow with the new launch. The boat worked very well though it made heavy work of towing a rowboat up stream. The water gauge on Brown's Overflow registered 2 ft 8 in. There was an abundance of water on the flats and the bay was well filled. Returned via Henderson No. 2.

On Brown's Overflow I counted the following pairs of ducks.

Mallard	7
Cinnamon Teal	19
Redhead	5
Gadwall	3
Pintail	4
Greenwing	4
Widgeon	1
Spoonbill	6
Total	49.

Very few ducks are in the

bay. The few that I saw were
in the backwater on either
side of the mouth of the Clough.
In the afternoon I worked
at the laboratory. Among other things
I weighed eggs of Marsh Wrens,
Magpie, Common Noddy, Sposibill and
Killdeer.

May 26, Friday.

Thermometer at 6:30 a.m. 46° +
Water gauge 1 ft. 1 in. The river
current ~~is~~ swift now and
the water is gray brown with
a fine sediment. Much mud has
deposited in spots that were
hard and sandy last summer.

The early morning was
beautiful today. The sun was
shining and the air seemed
milder than for several days
past. Lines of swallows sat on
the telegraph wires. In the
sun while others circled about
over the flats. I saw one fine
male Louisiana Tanager.

Vegetation seems really to be
starting now. Yesterday I saw
Scirpus americanus in blossom
and Distichlis spicata is becoming
green. New growth is starting
in the Phragmites and Bulrush
clumps.

A cold wind blew most
of the day and in the evening
it rained heavily up the valley.
On the evening the mountains
to the east stood out clear
and beautiful. The evening
sun before it sank turned Willard
Mountain a dull red brown seen
for its snow covered top. A

few minutes later when I looked again the sun had gone and the steep slopes showed deep purple in the growing dusk. After breakfast we went up the river with the launch and went out Knudsen No. 1 or "Pilla's" to North Bay. Conditions here were about as they were on Brown's. There is an abundance of water here and the flats are all well-covered.

On ~~Brown's~~ Knudsen's No. 1 I counted the following pairs of Ducks.

Pintail	4
Common teal	9
Gadwall	7
Mallard	1
Redhead	6
Blue-winged teal	1
Green-winged teal	2
Sharp-shinned	1
Total	31

The Redheads are attracted here by a long stretch of Salween ~~standing~~ water that is fairly deep. As on Brown's there were few ducks on the Bay.

On return stopped at Knudsen's. In the afternoon I worked at the Laboratory, making dissections weighing eggs etc.

Put up a two chambered bird box in evening.

May 27, Saturday.

Temperature at 6:30 a.m. 46° +.

The day was clear and bright all day. A south wind tempered the heat making it more pleasant than otherwise. After breakfast we went down Channel 2 in the launch and then in the rowboat crossed into east Pass and followed down through the Rat Trail into Klondyke. At Klondyke we came out into the willard & pursued east of the long point at Klondyke and then came around into South Bay.

I followed up the east shore past the sunken Scirpus roots marking the site of what was Lady's Island and then up past Davis Island around Mud Point and so into the mouth of Channel 2 again.

Though No 2 carries considerable water it is filling in fast and save at high water has little importance as an outlet of the river to the Bay. In 1914 it was an important branch of the river and its mouth was broad and open. Now it has built down and raised its banks until it extends half way across what was open Bay. Its mouth on the east is narrow and very

shallow. It was just possible to get out with a boat. The western branch channel $2\frac{1}{2}$ - is about the same. So the western between Mud Point and Doc's Island is a shallow mud that nearly cuts off the portion to the east from South Bay. The mud here is hard and firm due to the baking that it had in sun last summer. Raising the flats has a great effect in raising ^{them} above the water level. They become firm and hard and when flooded again do not soften as before.

A strong current came down East Pass and travel was easy. The Rat trail is a crooked passage barely wide enough to allow a boat to pass but is ~~so~~ ~~de~~ in places three or four feet deep. Such passages lead into shallow lakes and pools and the Rat trail finally spreads out in the Klondike region and is lost in great shallow reaches of water. Along East Pass are growths of Bulrushes but in the Klondike region where the saline content of the subsoil is greater these are replaced by Scirpus. For over a mile back from the Willard Spring salt water blowing in has killed the Scirpus. Along the channels

that are filled with flowing water is a narrow band of green where the plant growth has been enabled to recover. Elsewhere the dead stub rises blackened and lifeless. Large areas have been submerged by the rising lake water and the short stems projecting from the lifeless belts are found out a mile or more from the present short line. In places they are under 8 or ten inches of water. Many masses of roots attached by runner roots have washed loose and are piled up along the shore. Some of these bunches are the size of a bushel.

Ducks were abundant all through here. From the head of No. 2 to its mouth I saw the following pairs.

Cinnamon Teal	14	
Redhead	10	
Mallard	2	
Pintail	3	
Gadwall	2	
Spoonbill	2	
		Total 33

From the mouth of No. 2 down east Pass and back up the east shore I saw many more. The region here is peculiarly suited to them.

Redhead	200 pairs
Common teal	45
Mallard	12
Pintail	4
Gadwall	16
Spoonbill	11
Green-winged teal	4
Buddy Duck	4
Wigeon	1
Total	297

Redheads were enormously abundant and were in sight constantly.

Down at the edge of the salt water the south wind was blowing in Ephydra larvae and pupae and a few brine shrimp. Redheads, a few Bluebills, Avocets and thousands of Northern Phalaropes were gathered to feed upon them.

A mosquito with a very irritating bite was common on the salt flats of Klondyke.

Leaving Klondyke with a moderate south wind I hoisted a hunting coat on a boat paddle and a camera tripod and then sailed nearly to Lewis Island. From there we rowed in into the Mouth of Channel 2.

May 28, Sunday.

Temperature 52° water gauge 1 ft. 8 in
at 6:30 a. m.

Last night was warmer than for
some time with a true feeling of spring
in the air. There was in consequence
a great wave of migration among small
birds. Yellow Warblers were suddenly
common. Many Audubon's and
Pileolated Warblers were flitting about
in the leaves and I secured a
Macgillivray's and a Lutescent Warbler.
It was warm and pleasant all
day.

I worked at the Laboratory all
day long on material secured yesterday.
Put up a lot of ovaries from female
shore birds last night that I might
have them for comparison with early
fall migrants. The sexual organs of all
the *Chalaropus* were enlarged.

I secured a Pinon Jay in the
willows this morning.

In the evening I shaved and
cleaned up and then worked at the
laboratory until 9:30. Am getting
behind with my notes.

May 29, Monday.

Temperature at 6:30 a.m. 54°
Today was clear and hot all day with a moderate breeze from the South. About 8:30 we left the laboratory with the launch and went down the Reely Canal and then went down the old River channel in the rowboat. There was a very strong current down the ~~river channel~~ canal and the canal was deep throughout its length. At the mouth it had filled in the river channel for some distance but below the water was deep. Aquatic vegetation was starting but was not enough advanced to impede the progress of our boat. Today we followed clear down to where the channel broke up into minor runs and finally reached South Bay to the west of Slaughter Island. Great clumps of round Scirpus grew along one reach of the channel and Bulrushes in clumps were abundant. For a long distance the channel is bordered by growths of salt grass with great alkali barrens on either side. Clear down this is replaced by a clear stand of Scirpus.

americanus. At present this growth stands ankle deep in water. The lower part of this marshy region seems more protected and warmer than that above. In consequence vegetation is more advanced. Even the birds have felt the influence of this warmth as yellow headed Blackbirds here had young in some cases large enough to leave the nest. At the laboratory they are nest building still.

In the lower growth of Scirpus shallow pools 6 inches to a foot deep were common and channels led all through the marsh some were four or five feet broad others were hidden in the vegetation save for little arched runs. In all was a good current of water setting into the bay.

Carp were common all through here and were spawning. We caught one or two.

Four Western Grebes followed down ahead of the boat and with a pair of Ruddy Ducks were captured alive in the narrow channels.

Ducks were abundant. For the first mile of the channel

They were wild but below was
now tame. The following pairs
were seen.

Pintail	8
Mallard	23
Cinnamon Teal	29
Spoonbill	8
Gadwall	12
Redhead	36
Buddy	15
Bluewinged Teal	2
Total	133

One flock of ~~12~~ twelve drake
Mallards was seen, and another
contained 7 male spoonbills. These
I believe are birds that have
come in here already from the
uplands. The season is more
advanced up along the foothills
and these birds may have bred
hatched and the males now
come down here. Jim & I
told me over the phone tonight
of seeing a female gadwall with
young several days ago. Even
today I saw two female pintails
that from their actions had
young hidden in the grass.
No drakes were in evidence.
left left the bay at 4:00
and reached the head of the
canal at 6:00 In fifteen minutes
more was at the laboratory.

Today I captured a Coot
with but one leg. She then
seemed to have been cut off in
~~some~~ a steel trap. I doubt give
little trouble in trapping for
muskrats if the traps are set
under water but when the
coots return in the spring
trappers give up in disgust.

May 30, Tuesday.

Today I worked at the laboratory all day. This morning at 6:30 the temperature was 42° . Water gauges 1 ft. $7\frac{1}{2}$ inches.

Dackett came in the afternoon and did some work on the window casings.

I ordered 100 lbs of Barley and 100 lbs of wheat from V. F. Davis.

May 31, Wednesday.

Temperature this morning 6: 309.7-
46° water gauge 1 ft 8 inches.

Worked all the forenoon on monthly
expense account and accompanying
reports.

Finances are as follows:

Bosley Salary Mary	26.67
Tom S, Lowe, Hardware	6.20
.. .. Shaw, lumber	67.50
Transportation requests	68.13
Cash expense	<u>152.01</u>
	320.51

Authorization \$ 575.00

Expense to May 31 320.51

Available to July 1. 254.49

Sackett came this afternoon
and finished my work here for me.
I worked with him for most of the
afternoon putting ceiling on the laboratory.
He charged me \$9.00 for 2 3/4 days
work which was very reasonable.

I had intended to start
painting today but the sky
was cloudy and overcast with
rain beyond Little Mountain.
It was very chilly toward
evening and a heavy storm covered
the Wasatch mountains.

June 1, Thursday.

This morning the sky was heavily overcast and the air was very damp. The mountains loomed up through a dull haze and for a time I thought that it was about to storm. Toward noon the wind shifted north and the sky cleared but it became very cold.

I worked on correspondence until noon and then Cook and I went in to Corinne. We went to Kimball's in my launch and then took his auto and went on in. Made the round trip in about four hours and had plenty of time. It was very cold riding.

I had two boxes of salted skins and two packages of stomachs that had been packed this morning and a quantity of other traps. Straightened out my lumber bill with Shaw and certified to my May expense account before the Postmaster. Across from Nansin's there is a large field with considerable grease wood in it and above Frederickson's was more. I collected two Lark Buntings here. Bosley cleaned out the

laboratory in good shape
today

June 2, Friday.

Temperature 7:00 a.m. 48° . Water gauge
1 ft. 9 in.

Clear and warm all day today.

This morning I mixed up paint
and started Bosley on the Laboratory.
Am painting the building a very
dark slate. Fitted the window in
the storeroom also.

In the afternoon I worked on
notes and specimens in the
laboratory.

V. J. Davis came down and brought
me a sack of barley and one of
wheat. With him was Mr.
Fallon of the Utah Power & Light Co.
who was canvassing possibilities for
a power line down here. I told him
that I could use 3 drops and
a double connection on the table.
Probable rate will be 10 cents per Kilowatt
hour with a minimum of charge
between one dollar and two fifty.

This is also talk of a
macadam road down here to cost
\$40,000. I'd have an idea that
this will go through and when it
does it will mean a great increase
in hunting as the marsh will
be more readily accessible.

In the evening I went up
to the Bear River Club and called on
Mr. Davis. Talk was mainly about

Chucks, the marsh and hunting. Mr. Davis said that so far as shooting was concerned last fall was the poorest season in his remembrance. Members of the Bear River Club got comparatively few chucks. They did better at the Duckville Gun Club as the men there are in the main younger, ~~and~~ can stand and will undertake longer harder trips.

When asked his opinion of sink boxes he agreed with me that they are a bad thing. That shooting from them makes the chucks scary. I said too that it broke up regular lines of flight and gave the chucks no place where they might rest. And chucks must have a place to rest or they will forsake the marsh. Again hunters will get birds this way that would be safe from them otherwise and this tends to diminish game.

Mr. Davis added that he did not consider the half boxes concealed in rushes so bad.

He told of canvasback remaining all winter about a pond made by damming a warm spring near Honeyville.

Mr. Davis came down here just about 1880. - Tom Brown, Geo Davis and

others came down at that time
in a sail boat from Corinne and
usually anchored in Browns overflow
(from which the overflow received its
name.) On his first trip down
he was about 18 years of age.
He rowed down from the Channel
to a mud bar across from where
Kundsons Club stands now and
ate his lunch there. Brown and
others were in their sail boat below
him at anchor. Whistlers were
coming up from below in
enormous numbers and between
whisks while eating he shot 60.
The birds were fearless and
came all about so that
concealment was not necessary.

Whistlers were very abundant
in the early shooting. They lay
down on salt water (probably
feeding on brine shrimp) and then
came up into the river daily to
drink. Flights would come in and
immediately when they lit the
birds would begin to drink.

Angie Macdonald said too
that Redheads were then much
more abundant.

Davis said that in 1909 Ducks
were abundant as ever before.
In the early days all shooting
was done from the Duckwalk.

Gym Club on up the river. That
immediately back of the P. G. clubhouse
was salt water over one's boots.

June 3, Saturday

Temperature at 6:30 A. M. 52° .

The day was clear and bright and very hot. After breakfast I had Booley take me down to the mouth of Brown's overflow and from there walked west along the north shore of South Bay to a point north of the laboratory. Around the ground was very alkaline and was covered with short salt grass, *Salsolium* or was bare. Along the bay there was a good growth of *Scirpus* growing in water. Patches of cane and brambles were scattered all through. Vegetation was getting a good growth.

Ducks were common through here and I found a number of nests without looking for them in particular. Most of those seen were nests of Redheads. One brood of young Redheads was noted.

The mud through here was very sticky and walking difficult. I found that the mouth of the Bear River Club Canal had been extended far out in the lake and went out as long ways before I could cross it. And at that filled in boat.

On the area around I saw the following pairs of ducks.

Spoonbill	20
Mallard	27
Pintail	6
Redhead	87
Cinnamon Teal	11
Gadwall	4
Ruddy Duck	17.
Total.	172

The Ruddy Ducks were all about my bay with fairly deep shovels. I looked for nests but was unable to find any.

About noon I was north of the clubhouse I came in for dinner.

Mosquitoes are very bad in the salt grass but do not bother much any when else.

In the afternoon I worked at the laboratory on specimens.

We have given the entire building a coat of flat paint now I and this will help it a great deal. The store room will require another coat still.

June 4, Sunday.

water gauge at 7:00 a.m. 1 ft. 8 1/2 in.
The river has risen slightly. Perhaps
this is due to warm weather
melting snow in the mountains.
This morning I worked on
notes and correspondence at
the laboratory.

Vince Davis was up for about
two hours and we discussed
the cattle proposition rather thoroughly.
Mr. Davis contended that he
had walked ^{much of the upcountry} about over the
flats, and that where the cattle
had there were no duck nests
elsewhere where the cattle had
not grazed. Ducks nests were
common. I told him that while
this was true as I had just
covered the same area myself
that I did not think that there
were fewer ducks resting on the
marsh. That part of the grazed
area was not suited to them
and that ~~the~~ I did not
~~think~~ that cattle or horses would
step on a ducks nest in
grazing ~~any~~ more than they
would step on a bad tarp
when a man was sleeping
out. He asked how they would
locate a ducks nest hidden
by vegetation and I said that

I believed by the sense of
smell.

He agreed that there was
about 100 head of cattle in the
marsh now. I am satisfied from
talking with him that there is
some animus between he and Sackett
and Harper regarding cattle that
the main trouble has been
stirred up at the instigation of
the Bear River Club.

In continuing our conversation
I gave the sportsman shooting
him some hard raps for violating
the limit law. Davis tried to
advance the argument that it was
the business of game wardens to
detect and prevent this. I replied
that with true sportsmen with
the welfare of the game at heart that
this supervision would be unnecessary.
That conditions now had restricted
the breeding grounds of the ducks
until restricted shooting could
no longer be allowed without
detriment to the remaining game.

I sounded him on the
abolishment of the sale of game
and convinced him that it was
the thing that must come next.
He said that it had been
agitated for years but that it
had always met with much

opposition. He seemed strongly
in favor of it before leaving so
that this talk may bring forth
fruit.

He said that the Bear River
Club had all the property that
he thought they should own
and strongly advocated establishing
the remainder of the public domain
here as a public shooting ground
and allowing no more claims to
be taken up.

In the afternoon I collected
insects on the flowers of gray
willow.

On one place that I found
eggs of the Cinnamon Teal that
had been punctured and eaten by
some bird. Not far from here
was a family of magpies that
I thought might be guilty.
In the afternoon I collected with
my pistol.

June 5, ~~Saturday~~ Monday.

This morning I was up at 5:30 and left in the launch for Corinne at 6:10. At the Bear River Club I picked up Vince Davis and Angus M. Donald and they went up with me. Mr. Davis says that there is a project on foot to dig a north Bay from Swiford's Point across the opposite shore. This dig will raise the water there just at the dam and back the water up clear to the east end of the bay. It may better in case this is taken up to put in a series of two or three lower dikes.

In Corinne I bought various needed supplies.

Scott Gruesz came at noon and after getting our load down to the river we came on down in the launch. We stopped for a few minutes at the grasswood Knoll above Hansen's, saw the Burrowing Owl and several pairs of Curlews.

June 6, Tuesday

Air was cool and pleasant this morning and the entire day was not too warm though the sky was clear and the sun shone brightly.

After breakfast with Grisa and Boshy I went down to Sackett's land out Channel 4 as far as Mallard Point.

A good current of water set out No. 4 and water was deep enough to take a boat out as far as we went. Mud Lake at its mouth however was shallow and much finer than in other years.

The growths of *Bulrushes* showed very little new growth as yet ~~though~~ ^{though} the old last year's stalks stood tall and dead.

Thousands, millions of Chironomids were in the air everywhere and in the salt grass mosquitoes were enormously abundant.

In the immediate vicinity of Sackett's house all vegetation had been cropped down closely by cattle so that there was no corn. Elsewhere conditions were about normal. A good many ducks were in the Channel and in the rushes.

The following were counted between	
the head of No. 4 and Mallard Pond	
Cinnamon Seal	18
Spoonbill	6
Gadwall	3
Sintail	5
Mallard	4
Redhead	70
Ruddy Duck	4
Total.	110

The Snowy & Night Herons and
 also that nest here has just
 come in. I found a few nests
 that were barely started. None
 contained eggs.

In the afternoon we worked
 at the laboratory. I explained to
 Guisea various bits of routine
 work about the place.
 Night hawks were first seen
 this evening. This is a very
 late date of migration for them.

June 7, Wednesday.

Water Gauge this morning 1 ft. 8 inches.
temperature 52°.

This morning after breakfast
I saw Fred Hansen at the Laboratory
for a few minutes and made
arrangements with him to take me
up into the marshes below
Bergham. He is now catching
carp for Hall.

We took the launch and went
out Channel 3 and made a
count of the breeding ducks on
the main channel and all the
side channels including the
Cross channel to 3 1/2. It was
clear and hot today, though
the morning was cool and pleasant.

There are some changes showing
in the South Bay now. Forty or
Fifty gulls and about 50 Pelicans
were in sight.

In addition we found about
100 Pintails and about 60 Spoonbills
all drakes spread out feeding on
the flats. Nine male Cinnamon Teal
were seen in 3 or 4 flocks also. The
two former groups are birds that
have completed their breeding some
where else and now have nothing
before them but the molt. A few
of the pintails already were going
into eclipse plumage.

The following pairs of ducks were
seen in Channel 3 and its branches.

Cinnamon Teal	46
Gadwall	6
Spoonbill	7
Mallard	8
Redhead	18
Pintail	1
Ruddy	1
Total.	87

lake Cinnamon Teal too were seen
in small parties so that they
are banding together.

There were a few dead Spoonbills
along no. 3 at its mouth that
had died this spring. I
saw perhaps eight or ten of them.
South Bay is noticeably lower
here than it was last year. The
water does not come up nearly
so far. This is without
doubt due to low water in the
lake causing better drainage of
the flats.

June 8, Thursday.

This morning it was and today was very warm. Was up at six thirty and after doing some odds and ends at the laboratory had breakfast. About 8:15 with Grisa and Bosby left in the launch for South Bay. It was very warm all day and all of us suffered from sunburn. I was able to go down as far as usual in the launch and from there we went on down the bay in the rowboat.

Potamogeton is growing rapidly now and shows strands four or five inches long in places. Everywhere on the marsh were great swarms of Chironomids. They were especially noticeable on Stangsted point and Stangsted island. Millions of them hung in clouds that made straight columns ten to twenty feet high in the air. At a distance these whirling masses appeared like smoke. I saw thirty or forty of them at once scattered along at intervals of a few yards. The vegetation was black with the insects in places. These flew as I passed in great swarms that completely enveloped me. Fortunately these insects neither

sting or bite nor do they attempt to alight on one in any great number. Only passing annoyance was caused as they touched faces or hands in passing. The water was covered with their empty pupal cases from which the insects had just emerged. Many of the fish lay drowned with them. Also the mud and snowing in the water by alternately doubling and straightening head and tail in the body were myriads of the larvae. I tried to get a photograph of the adults.

We made a count of the pairs of ducks seen from Slaughter Point to three miles west of Slaughter Island. The following pairs or breeding females were noted:

Redhead	241
Ruddy	3
gadwall	4
Immature Teal	5
Mallard	23
Spoonbill	5
Widgeon	1
Total	282

At a point a mile west of Slaughter Island the Scaevola in view from the shore line was short and dead giving a barren appearance. This is wholly unfitted to breeding.

Ducks. Many short tail shute
ran out in the water here.
Farther inland the water from
the old river channel keeps the
rushes fresh & green.

I was much surprised to
see 200 or more Greates & Cans
in the bay. Some were right
up near the shore line. Though
none were shot the birds were
identified with no doubt whatever.
All noted positively were Greates.
One or two Junco were identified
uncertainly. These were certainly
not breeding birds.

Forty or fifty Northern Phalarope
were seen here and two were
taken. Those observed closely were
males. The sexual organs of one
taken were enlarged.

A flock of fifty female Wilson's
Phalarope was seen also feeding
in an open lake.

Willit were seen in small flocks.
Fifteen or twenty were observed in
one bunch.

When we came down into
the open bay in the morning. There
were a few scattered Pintail Greases
about. Perhaps twenty five were
seen above Slough Point. On
returning toward evening. There were
nearly one thousand of them with

A scattering of male Mallards among them spread out on the flats at the mouths of $3\frac{1}{2}$, 3 and even over into Pintail neck - as we came up they flew off to the south and west with low whistling and quacking notes. These birds had evidently just come in here today. They is not telling from where.

Certainly they had not bred here as I have not seen one tenth this number of Pintails since my arrival on May 15. So in making a bird census during a hurried visit these birds would be most misleading as they would certainly be considered breeding birds.

Back of Slaughter Point was a rookery of olds that I ^{spore} estimated at 1500 hundred. There were many more than on last last year. In all the rookery covered about 60 acres. with them were about 200 ^{young} ~~Red~~ Herons, 50 night Herons and 150 Great Blue Herons.

The rushes here and Scirpus were nearly all dead due to rising salt.

On Slaughter Island vegetation was a new growth of fresh green Scirpus. Neelys Island was

showed as a low bar.

The water was high
west of Slaghters Island and
decidedly brackish. I found a
few Antennia almost in to the
shore line and three hundred
yards out they were abundant.
There were many myriads of
tiny ones, not long hatched
had. With them were a good
many Ephydra larvae. The pupae
of the latter were attached firmly
to Scirpus stems. Floating in the
water was Nostoc and another
alga.

In South Bay were great
numbers of carp came out to
spawn. We killed eight females
skinning them with paddles.
These I preserved and I spent in
Slaghters Point. On examining the
stomachs I was surprised to
find them filled with animal
matter. We stripped them in a
jar and brought them in.
When I examined them in
the laboratory later I found the
following contents.

Mud	<u>10%</u>
Animal matter	97%
Vegetable ..	<u>3%</u>

The mud was probably taken
in with food adventitiously.

The vegetable matter was
stems and leaves of Potamogeton
pectinatus 2%.

fragments of stems and a few
seeds of Scirpus americanus 1%.

The animal matter.

Chironomid larvae 96%

Dytiscid " 1%

Stethomyid " trace.

This finding was a great
surprise to me as I had
supposed them eating Potamogeton
all out here. Certainly they
root up quantities as I see it
floating in the water.

On the evening of took larvae
from 6 of the Wilson Phalarope
shot. And I will let for subsequent
examination. I am putting this
material up in 4% formalin and
then transfer it when fixed to 70%
alcohol.

June 9. Friday.

Last night was the first warm night that we have had. This morning the temperature stood at 66°. The warm weather is ~~beginning~~ melting snow in the mountains as the river has risen in the past few days. The water gauge this morning registered 1 ft 6 1/2 inches.

It was very warm all day until about 4:00 P. M. Then the wind shifted from west to north west and became stronger and the air was much cooler. I worked at the laboratory all day. In the forenoon I separated out the Ephydra larvae, Artemia etc. collected yesterday and examined a great mass of material from the carp stomachs. For results see notes of yesterday. Grisea and Bosly were working on the birds secured yesterday.

In the afternoon Grisea and Bosly went out to Basin's overflow. They reported practically no ducks on the north lake. The high water had banked the water up on the west shore. They saw a female Mallard with half grown young and that was about all of interest.

I put up a couple of new

shelves in the laboratory today. One
for books and another big one in
the storeroom for salted skins.

June 10, Saturday

Water gauge at 6:30 a.m. 1 ft. 6 ³/₈ in.

Clear and hot all day today.

After breakfast Giesa and I walked across to North Bay and completed the examination of its shore west to Swiford's Point.

Toward Swiford's Point the Scirpus and other marsh growth was very fresh and green. A heavy north wind yesterday had blown much water on me but most of it had receded. Water was fairly deep all along the shore line.

The following pairs of ducks were counted.

Pintail	3
Redhead	110
Common Teal	15
Mallard	7
Gadwall	3
Buddy Duck	14
Total.	152

Redheads nests were common. We found a dozen without looking for them. Two broods of Mallards ~~ten~~ days old were seen and one brood of gadwalls newly hatched. A Redheads nest with hatching young was seen.

Mosquitoes were very bad in the salt grass.

I sent Bosby down No 1 this morning in the rowboat. He reported very few ducks on Pintail Neck. He found that the number of Stitts down there had greatly increased so that they outnumbered the avocets. I asked him to get me some clams but he was unable to find any large ones.

Worked this afternoon on some birds secured this morning. Found a female stitt in which four ovarian stitts were easily seen.

Cook went in to Corinne today and brought out some supplies.

June 11, Sunday.

Water gauge at 7:00 A.M. 1 ft. 6 $\frac{1}{2}$ in.
temperature 50°.

Grisea and I worked nearly all the forenoon in dissecting out the ~~digestive~~ ^{intestinal} tract of a large carp. I made a drawing and notes on this. Jim & Tokio, Ole Allen and Angie MacDonald came down from Penn and with Clyde Webb were down for an hour or so. They say that they are going to cut some hay down here. Davis will probably run some cattle later on in the season.

Fred Hansen came down in the afternoon to cut some hay on the section belonging to the Duckville Gun Club but found that mosquitoes were entirely too bad. So he came over and was at the laboratory nearly all the afternoon. In mowing he had run across the nest of a cinnamon teal. As the old bird flew off the knife caught her and cut off both her feet. She escaped. Fred said that in mowing in Frederickson that they often ran over ducks' nests but without injury. He believed that more ducks nested on the uplands than below him on the

marsh.

He said the Sackett property included 36 and fraction acres and that he sold it to Sackett for \$2000. Bosley says that the purchase price in a compromise was \$2100.

June 12, Monday.

Water gauge 1 ft. 6 $\frac{1}{2}$ inches.
Temperature 68°.

The sky was lightly overcast at times during the forenoon but later in the afternoon cleared entirely. Cool went on to Corinne today and Giesa and I sent laundry in with him.

After breakfast Giesa and I went in the launch down the river and out the Ruby canal to its mouth. The canal was deep though narrow and I had some difficulty through the launch blowing in against the bank with a strong north wind. We left the launch at the mouth the canal and walked across to Mallard Point. About 75 pairs of clis have come in here since my last visit and have started nests.

We followed the shore line down to Long Point and then on around into the bay behind Land's End. For two thirds the distance to Long Point the Scaevola growth was waist high. Below here it became thinner and below the point much of it had been killed out. It varied in width from 50 to 200 yards wide.

inland was an area of dead
Scirpus and alkali barrens.

The water was deeper ~~here~~
than I had thought and has
rained at least two inches
recently.

The following pairs of ducks
were counted in this area

Cinnamon Teal	12
Redhead	135
Gadwall	6
Spoonbill	1
Ruddy Duck	7
Mallard	13
Widgeon	1
Bluebill	1 (?)
	176

The Bluebill was a single
drake that swung by us a dozen
times as ducks will past their
nesting place no female was seen.

3 broods of mallards ten days
old were seen and another family
that $\frac{3}{4}$ the size of the female

The geese are now down
in this area. I found five
places where geese were roosting.
Areas of Scirpus several feet long and
a foot or two wide had been
broken down and with the dead
growth underneath formed low
platforms partly elevated above the
water. These were covered with

fresh dung. Many feathers were scattered about. These geese are now molting and will not appear on the marsh again until July. I looked carefully for the birds but did not see any. I asked Hansen yesterday where they motted and we both agreed that it must be somewhere in this area.

In considering a wild fowl reservation here I had thought of running a line across from North Shore Island (or Bay Island) as it is known to some) and closing the lower half of Hansen's Island. On looking the matter over carefully however I find that this is not sufficient. Should the lake rise again this area will be almost barren as already much vegetation has been killed by salt. It is almost imperative that the entire island be covered. In making this Sackett should be bought out. A warden would have to be placed in charge of the marsh and this warden could live in Sackett's house. For shooting purposes blinds could be allowed within 25 feet of the outer edge of the rushes from the mouth of $3\frac{1}{2}$ to S. Lagoon islands. This would allow hunting during the open

season and would not affect the
ducks. There should be two
wardens I believe. One a local
man well acquainted with the
marsh (Sackett or Keanan perhaps)
and the other a man from
outside the state a man of
undoubted integrity (so far as
game matters are concerned at least).
This last man should be in
charge of the station. By preference
would be a ^{trained} naturalist capable of
making observations on the water
fowl that would be of value.

It might be well too to extend
the line of the preserve across
from lands incl. of Neely's Island
to Klondyke so protect the spoonbills
and Bluebills. All lines ^{marking}
the reservation should be indicated
by cement posts that there might
be no arguments in regard to them.
Stations for blinds on the west
shore of South Bay might be indicated
by the wardens.

The installation of a registering
microphone might aid in picking
up stray gun shots out of the
hunting season.

~~The~~ damage by cattle grazing
I think will be worse after
the breeding season than before.
The thousands of ducks that

Come in during summer need
cover in which to smelt. If they
do not have it they will be in
a bad way.

From the bay at the end of
our trip it could be farther seen
or shown him plainly. It was low
and flat slightly raised above the
water level. The *Scirpus* growth on
it seemed entirely dead. This
fall if opportunity offers I
want to travel this shoreline
from Blue Creek to Promontory Point.

From here we proceeded back
inland to the old river channel.
There was a great central
area here nearly bare of vegetation.
We attempted to wade the channel
with boots & but found it too
deep. Finally removing boots
and trousers we crossed it.

The water in the middle wet
my jape stick so that certainly
we would have been in a bad
way with boots on. The bottom
was soft and muddy. Deser
growths of Potamogeton pectinatus
were appearing and moss
and algae was abundant.

This same moss was appearing
in great quantities on North
Bay Crossing the old river channel

there was first a narrow band
of salt grass and then a
thick alkali barren. Higher
up toward Sackett's short salt
grass appeared and a mile and
a half below Sackett's this growth
covered every thing. The old
willow stubs marking an
ancient channel were still much
in evidence. They show on the
bank of the first western branch
of the old channel too. I
estimate that they grew here in
the forties or fifties.

Carp were present in north
Bay in numbers as far down as
we went.

We had no trouble in coming
up the ~~old~~ canal in the launch. This
canal is very deep as in coming up
the launch drew far down and
made a great wave behind.

Reached the Laboratory about
4:30.

I sent Bosby down no. 2 this
morning. He encountered a flock of
30 Bonaparte's gulls and secured
three of them. He collected also a
greater yellowlegs. He reported nothing
unusual in the way of chicks.

June 13. Tuesday,

Water gauge at 7:00 a.m. 1 ft. 6 1/2 in.
temperature 60°. Clear and warm
all day.

This morning I worked at the
laboratory on notes correspondence
and research into the characteristics
of ovaries.

Bosley and Griesa went out
3 1/2 and across South Bay as far
as Slough Point. They reported about
450 Pintails, 502 Pombills and 25
Greenwinged Teal that were at the
mouth of 3 1/2. They brought in
one female Green-wing that they
found with a wing broken by shot.
There were also about 50 mallards.

Afternoon I went out the
Bear River Club canal with the
launch. The following pairs of
ducks were counted along it.

Cinnamon Teal	11
Mallard	4
Gadwall	1
Pombill	2
Ruddy	3

Total 21.

At the mouth the mallards
made a good growth and
here there were about 200 mallards
and 50 Pintails all drakes. The
runs through the rushes were
filled with feathers that they

had shed. I saw two Mallards
that seemed barely able to fly.
Grisea killed a Pintail today
that seemed to have the intestines
normal in every way.

A male pelican that he killed
had a horn only 12 mm high by
about 80 mm long. This bird
was diseased. But one testis
was developed and it was small.
The intestine was thick walled
and intensely irritated in the
duodenum and had many
small hard ulcers along its course.

The boys reported many carp
in the bay. They brought in two
and I had their stomachs preserved.

June 14th, Wednesday

Water gauge at 7:00 a.m. 1 ft 6 1/2 in.

Clear and warm all day.

By storm of early day a south breeze springs up that tempers the heat very pleasantly.

With Griesa I left the laboratory at 8:30 for Lands End West. The pump on the motor refused to work after she had started and I had to take it apart and fix it. We went down to the mouth of the Nuley canal with the landing and then on down the old river channel in the rowboat. We turned out the first west channel and followed it into the bay east of Lands End and from there proceeded on foot.

Along this West channel the following ^{this} Ducks were seen

Ruddy Duck	3
Common Teal	18
Redhead	26
Gadwall	6
Spoonbill	2
Mallard	5
Total	60

From this bay in West the the end of the island was covered with rushes but all were dead - a sickly yellow new growth showed along the water's edge but inland

no new shoots had started.
Few breeding ducks were seen. The
following pairs were counted.

Mallard	2
Common Teal	4
Redhead	6
Gadwall	2
Spoonbill	1

The country was hardly
suited to them. There were many
quack in her morning but none
were seen. Their tracks appeared
in all the small channels and
in some places the mud was
still ~~small~~ suspended in the
water when they had passed. I
watched far ahead for them but
saw no sign of them. There were
many feathers strewn about.

Water was slowly submerging
these areas of dead rushes. Pools
and small runs of water were all
through. Some of them were fairly
deep. Water here was saline.
I saw Brine shrimp in pools and
bays. *Potamogeton pectinatus* was
growing here in water stronger
with salt to the taste than in
normal salt solution. It was
barely starting.

A Broad bay cut the end
of the island off. large areas of
submerged rushes could be seen

off shore that had been covered
by water recently.

Above the area of dead
rushes was an extensive
alkali barren. Still farther up
was the rush area kept
fresh by the old River Channel.

Water in the old river channel
has raised nearly three inches.
Probably because of the growing
aquatic growth.

We were five hours in going
down and two and one half in
coming.

On Land's End was a great
flock of Pintails with scattered Mallard,
Spoonbill, Greenwinged Teal, and Redhead
with a few scattered Wigeons.
All were Shrikes. I estimated
as follows.

Pintail	2600
---------	------

Spoonbill	50
-----------	----

Mallard	100
---------	-----

Greenwinged Teal	100
------------------	-----

Redhead	50
---------	----

Wigeon	3 (perhaps more)
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I doubt if many of these birds
have bred in this valley.

Finch, Besson, Husher, Moore, and
Rogers officers etc of the Duckworth
Gun Club came down in the evening.

June 15, Thursday.

Today I worked at the laboratory all. Part of the time I spent studying the ovaries and other parts of shorebirds to determine whether or not they had been breeding.

The gun club members who came down last night left this afternoon. They reported seeing a ^{young} goose on Slaughter Island.

June 16, Friday.
Very hot all day today. Sent
Bosley to Corinne today for supplies
and water.

After breakfast with Griesa
I went down No. 1 to look over
shorebird material. Very few ducks
in sight here.

Yesterday Clyde Webb told me
the Davis had had them putting
up hay up along the river. They
have cut between 30 and 40 tons.
The mowing knife cut into one
male American Seal and killed
him. They found one gadwall's
nest in cutting. Last Sunday Fred
Hansens caught a female in the snow
blades and put off both her
feet. The bird escaped.

The water has raised two
inches at least down here on the
bay because the water has been
backed up and checked by growing
Potamogeton on the flats. This rising
water has covering considerable areas
on the banks of the overflows. No. 1
is higher than at any time last
year. Since warm days have
come cattails and willows have
made great growth. Four days ago
I saw bursting down in willows
these black willows (Salix
amygdales) grow rapidly. Two

ago a small shoot started here
on no. 1. Now it is a fair sized
bush 3 1/2 feet tall. Other little shoots
are coming up near. I had Bosby
chase off the growing willow shoots
on the trees about our landing
stage.

WE collected 10 shells, 9 Wilson
Chalrops & 4 Killdeer.

In the afternoon at the
laboratory these were skinned
and the ovaries of the females
extracted. These I dropped in
picric formal as a fixative. I am
going to attempt to differentiate
nucleated cells from those that
have not developed by means of
stains.

In the evening Joe took us down
on the bay to try out a new ^{and} boat.
I was steersman and found it
great sport. We went down the
last shoot as far as Davis Island.
The boat ran very well. Moss
was high but it ground along
through it. On more open stretches
where the water was shallow it
made very good time. Cook claims
that on long stretches of smooth
mud that it will make 25 miles
an hour.

June 17, Saturday.

Today I worked in the laboratory all day. ~~Spent~~ A part of the time I labored with the shorebird material collected yesterday. Grisa and Bosly were out Bundsen No. 1 this morning but found little that was new.

The water gauge registered 1 ft. 7 in. this morning. Fred Hansen reports a drop of five inches in the river at his place but the water is backing up below so that it holds its run here.

In the afternoon Grisa and I went up along the river and examined the area in the Bear River Club grounds where McDonald and Clyde Webb have been cutting hay this past week. The area involved extends along the river bank for a distance totalling about $\frac{3}{4}$ of a mile. The strip is not continuous but extends from the east end of the fence on the southern boundary of Section 25 (up stream from the laboratory) east to the line between the Bear River Club property and Bundsen's. In parts the hay

was too thin and there was
passed over. ~~About~~ a strip
equal to $3/4$ mile long and
from 4 or 5 to 20 ~~cut~~ snow cuts
wide was taken. In addition
areas of snow down around the
willows had been mowed with a
scythe. ~~Between a thicket and a~~
A part of this area is ~~around~~
the clubhouse and the guide house
around the latter ducks would not
be expected to nest but around the
latter they certainly do and
should not be disturbed. So me
this mowing is worse than
the ranging of cattle. I took
a roll of film showing the
cut over areas.

This evening with Giesse
Bozley and Coof I visited Webb
and Mc Donald at the Bear River
Club. Some information in regard
to ducks nesting in the snowed
areas was brought out during
general conversation. Webb said
that he had caught a male
Cinnamon Teal in the Knife
had cut off the tip of his
bill, one foot and his wing.
Mc Donald had cut over one
Gadwall's nest and several nests
of Cinnamon Teal in the area
near Knudsen's. The Teal had

deserted but the gadwall
still remained. Below the club
he had run over a number
of Seal nests. One Redhead's
nest had been discovered but
he had cut around it to leave
the female shelter.
Very hot all day today.

June 18, Sunday.

Somewhat cooler this morning. But hot late on. The mountains are now misty and distant as in summer.

This morning Grisea and I after some trouble worked out the intestinal convolutions of a sucker. Webb had fifteen or twenty last night that he had seized in an overflow. The species prove to be *Castostomus ardens*.

After dinner Grisea and I were shown the Bear River Club house by Webb. We examined the bird collection with interest and made note of several interesting records.

Afterward we went out and looked at the gadwall's nest laid bare by the mower and I took some pictures of it. The bird was still on. Nearby was down from another gadwall's nest that had been destroyed.

Below the Bear River Club I found a Common Seal's egg that might have been broken by a rat.

Duckette and White were at Duckville in the evening in honor of

a birthday for Helen Cook and
myself.

~~My dear Helen~~
~~My dear Helen~~
~~My dear Helen~~

My dear Helen
I have just received your
letter of the 15th and was
glad to hear from you.

Yours affectionately
Helen Cook

June 19, Monday

This morning about 7:30 I left Duckville and rode in to Corinne with Harpers. They carry Cream in every day and send it to Brigham by express. We drove to Kandas' crossed the river in a boat and then took a Ford the rest of the way.

Kandas Bros of Brigham brought 200 head of cattle down Saturday so Fred Hansen told me. This morning practically all of them were killed or standing near the Bear River Club. I counted 160 as we drove through them. It was quite warm all day but clear and pleasant. I left Corinne at 9:41 and after changing at Brigham reached Ogden at 11:00.

Registered at the main and then spent the rest of the day in purchasing supplies. I had lunch at the Reed Hotel. He said that it would seem that he had been deceived by Davis as regards the number of cattle on the marsh here. He said that plans for diking North Bay were as yet tentative. That a final report would be rendered by an engineer this week.

The paper this morning
announced the calling out of the
National Guard. I called up Griza
at Duerillo in the evening but he
said that as yet he had received
no word.

This afternoon I called up the
State Game Warden's office in
Salt Lake City to learn that he
was at Fish Lake and would not
return for several days.

June 20, Tuesday.

This morning it was cold
and the sky was cloudy and
overcast. At nine I went
to Salt Lake City on the trolley
reaching there at 10:10.

Called at Schramm-Johnson's
to learn the amount of my
last bill. It came to \$7.61. In
addition I purchased 1 lb of
Formaldehyde.

At the Mine and Smelter
Supply Co I bought a small
order of glassware and ordered
it sent to Corinne by express.

At noon I called up Geo. Smalley
who is teaching at the Summer
School in the University of Utah.
He met me at Finch and Rogers
and we had lunch together.
About two I visited the

State game Warden's office and secured a permit for Mr. Griesa to collect birds. I had hoped to get in touch with Joe Smith, Deputy Warden but he had been called suddenly to Fish Lake. Met Mr. Terry a deputy.

I tried to buy some head nets for quarts to stay but could find none that were of any account.

A few minutes past four I was through. Called on Mr. A. W. Trefazza for a few minutes and enjoyed talking with him very much.

Left Salt Lake City at five and reached Ogden about 6:10. Found Griesa waiting for me at the Marion. His summons to join his company had been wired to him this morning. He came up the river in the launch at once. We had dinner together at the Reed and then straightened out various business matters. He left for Lawrence Kans at 9:10 P.M. I regretted his departure very much as he was taken hold of the work in good shape and had just mastered the various details so that he was of much assistance. It

Will leave me alone again for
some time. I fear.

I wired the office notifying
them of his departure at once.
Called up the Duxville gun club
in the evening and told Ray
to meet me at the train in the
morning.

Tonight it is very cold
with a strong north wind. It
rained a little in Ogden and
I was told that snow fell in
Garland.

June 21, Wednesday.

Was up this morning at
6:30 dressed shaved and
packed up.

Left Ogden on the Oregon
Shortline at 8:30. This train
now goes through Brigham and
up the Malad branch without
change. Reached Corinne at 9:40.

It was raining in Ogden and
it rained quite heavily until
about three in Corinne. Bosby
was delayed for some unknown
reason and did not reach
Corinne until two or after. I
called Hansen finally as I thought
that he might have broken down
somewhere but learned that
he had not passed there until
11:30.

Corinne is not an ideal place in which to kill time. It was cold and rainy this morning and in the post office and Blacksmith Shop was the only fire that I could find.

When the clouds cleared away finally the Wasatch range was white with snow down to about 6000 feet.

Cook's came in to Corinne in their Ford about two. Mrs. Cook rode down in the launch and Joe and I went in down in the car. It was hard driving as the flats were very slippery. We reached Kindred's only a little bit ahead of the launch.

It was cold and raw at Duckville but cleared away entirely in the evening. Everything at the laboratory seemed all right.

June 22, Thursday.

~~Water~~ This morning as soon as I could get breakfast I went up to Hansen's in the launch and with Fred Hansen drove up to the Black Slough below Brigham. It was cold this morning with a north wind and an early morning temperature of 43°F . The cold kept down the mosquitoes. otherwise they would have been unbearable while driving.

The Black Slough rises near Honeyville and comes down in below Brigham to drain into the eastern or northern part of the Willard Spur. On its lower course it drains water through the channel from Bear River. We worked the lower end for a distance of about four miles. There is a great series of sloughs here grown up largely with the jointed reeds and with long channels with deep runs. *Scirpus americanus* is common. The small *scirpus* known as wire grass was abundant.

In aquatic vegetation
~~*Betula nana*~~ *Betula nana* (369)
was abundant all through.
Chara #370 was common and there was a

great growth of Potamogeton pectinatus.
On drier areas were great
growths of Rumex, Cocklebur,
Pondia erecta, Onagra strigosa,
Burchus asper, Radiola linifolia
and Lactuca integrata were abundant.
Distichlis spicata covered large
areas and I found great growths
of Nardum jubatum.

I planted (372) Triglochin maritima
a Chenopod (373) Atriplex hastata
and a chickweed (371) Polygonum aviculare
with a grass (367 & 368) Polygonum monspeliense
were common and would afford
duck food. Salicornia subterminalis bordered
the alkaline flats and I found
some Allenrolia occidentalis. The
small knoll had a few Sarcobatus
vermiculatus on it.

I worked up through the
center of the swamp and returned
by another route. I estimated roughly
that I had covered half the area.
The channels were rather deep so
that it was difficult to get
around. A good many Chicks
immature Seal and Spoonbills had
gathered in here. This area is
constantly pastured by Kumda
brothers and tracks of stock
showed all through the bushes.
Yet there seems to have been little
effect on the ducks.

In the following table the first column gives the pairs of birds actually seen, the second column the same number multiplied by two as an estimate of the actual number of breeding birds.

	<u>1</u>	<u>2</u>
Common Teal	49	98
Redhead	73	146
Gadwall	7	14
Spoonbill	17	34
Pintail	5	10
Mallard	11	22
Ruddy	<u>7</u>	<u>14</u>
Total	169	338

Much of the region visited was too deep to wade so that we were unable to work it thoroughly. I am firmly convinced that duck censuses to be accurate must be begun not later than May 15 and should extend beyond June 20 if possible. July notes would be almost without value.

In going out we got in our channel a foot over the bars and stuck with one horse down. We unhitched and Fred took off the cover. He fastened a rope to the tongue tied the other end to the corner and with the horses on dry ground pulled out easily. We came back to the rig

About three at lunch and
then started back.

On the way we met Andrew
Jensen ("Andrew Blue") and Peter
Christiansen. They have returned
from taking more cattle below.
They said that there were 200 head
down there down there but I
think it is well over 300 myself.

June 23, Friday.
Temperature at 6:30 50°. Water
gauge 1 ft 5 $\frac{3}{4}$ inches. The rain
has brought a marked rise in the
river.

I worked at the laboratory
all day. Made up a few young
birds collected yesterday and
straightened out the mass of
Ochetus that has accumulated
during my absence.

I sent Bosley down Channel 2.
He reported nothing much in
the way of ducks. Wilson Phalaropes
were common and he collected
some young yellowbills. He has
attempted to collect clams for me
in Channels 1 and 2 but has found
them all dead. The dry season
last year must have killed them.

The Bear River club in joining
to hold back Sackett's and Verpus
Cattle are throwing a fence at an
angle across section 26 Twp 9 N,
Range 4 W. This is government land.
They have begun at the southeast
corner and are running directly
toward the northwest corner.

Furthermore that part of section 25 that
lies north of the river is still
government land as it is unsurveyed.
When it is finally surveyed it will
be a railroad section and then

The Bear River club will have
an option on it. The small part
of section 25 that is south of
the river has been surveyed and is
the part on which the
laboratory is located.

June 24 Saturday.

Temperature this morning 52° +
Water gauge 1 ft. 5 in. The river shows
a marked rise due probably in
part to run off from the rain
of Wednesday and in part to the
turning in of irrigation water that
is not needed because of this same
rain. Clear and warm all day.

After breakfast we went out 3½
in the launch. The water in
South Bay was as high as I
have ever seen it. Near Sacketts
3½ was almost bank full. A
raise of another inch would
flood considerable areas. The bay
was full of water of a milky
muddy color and was
draining swiftly. There was a
current of nearly 2 miles an hour
clear over along the rushes on the
west side. The water here was
twelve inches deep at least.

With this abundant supply of
fresh water there will be no sick
ducks for some time at least.

There were about 200 male
Cinnamon Teal scattered along
at the mouth of 3½. Other ducks
showed little change save
that there were fewer drake
Pintails than usual.
I laid in a blind above

June 26 Monday

Water gauge at 7:00 a.m. 1 ft. $4\frac{3}{4}$ in.
Clear land very hot today.
Every afternoon a breeze springs
up from the south and blows
steadily. Usually it begins by
10:00 a.m. Sometimes it delays
until noon. In its steadiness
and pleasant coolness it
reminds me strongly of the
trade winds of Porto Rico. The
air is hot and dry but the
soft force of the breeze brings a
sensation of coolness that is
refreshing.

After breakfast I left for the
grounds of the Chesapeake Duck Club
in the launch. I went up
as far as Hansie's in the launch and
left it there. Mr. H. S. Mills who
is in charge of the Chesapeake property
met me and took me up to the
club house in his car. The clubhouse
is about a mile from the river
and stands on a low knoll.
We were out in the forenoon and
explored Goose Island and some
marshes near it and in
the afternoon worked back as far
as the entrance of Woods Creek.
At present the club have
32 inches of water at their dam.
Formerly Woods Creek ran directly

through into North Bay. Mr. Harvin about 1902 or 1903 formed a club and dammed the creek to make a good body of water. The Chesapeake Duck Club at present has 50 members. With water at its present stage they have about 2000 acres of water.

I was told that the club rules specify that any member violating the game laws shall be expelled and that no member is allowed to sell his ducks. Mr. Mills told me that for a short time he was steward of the Bear River Club and that these members were allowed to turn in their ducks on their board bills.

The lake here averages deep so that it is easy to row a boat in it. It runs from 3 or 4 inches to 3 feet. The average depth ~~down~~ is from 8 to 12 inches or more. There is a large area of about 1200 acres in one body and then some marshy channels.

Potamogeton pectinatus grows everywhere covering practically the entire lake in the open water. Because of the depth of water it makes a great mass of leaves and stems. It rises to the

surface flows and then when
the first frame sinks again.
When then were carp in the
lake these fish rots great masses
of it loose and stones rolled
it ashore in windrows. The
fish were taken out by draining
the lake and now the Potamogeton
sinks and lies on bottom.
At the beginning of the hunting
season the board is taken from
the dam. This lowers the water
exposing a part of the Potamogeton
for the shallow feeding ducks.
This is done two or three times
during the season as the feed
is eaten up.

Myriophyllum (376) covered
the bottom when the water was
deeper than 10 inches. It grew in
a dense carpet beneath the
Potamogeton.

An alga or moss (see algaloid)
bearing this date was abundant
growing on the surface of the water.

A round *Scirpus* formed dense
clumps covering large areas at
the eastern edge of the lake.

Scirpus americanus covered
large areas of shallow water and
also great growths extended
out on drier portions when now
there was no water.

Goose island a Knoll in the lake
and other knolls showed
scattered growths of Sarcobatus
vermiculatus. Scattered clumps of
Atriplex confertifolia were found and
at low woody stemmed plant
(see specimen). Allenrolfea was
common and in suitable
localities were dense mats of
Distichlis spicata. A pigeon
grass was common and two
other grasses were found. On broad
flats covered with abundant
vegetation were in addition
Lactuca integrata, Sonchus asper,
wire grass (small & curly) Cottelbush
(Xanthium echinatum) Rumex
a few Radiola hispida, Anagra
pativa. Considerable clumps
of Melilotus alba were found and
some Melilotus officinalis. Salicornia
rubra grew on the barriers.
(For plants see nos. 375-383).

As a breeding ground this
area is not used as much as
it might be. There are a number
of farm houses about and I was
told that some of the farmer boys
gathered eggs. A dig from one place
shown was reported to have
eggs. And I saw one Coyote. He
put a herd of cattle between me
and sneaked away. Cattle and

Horses range through a good deal of the marsh and eat down the rushes which may too be a disturbing factor. Drier areas are cut for hay and many nests exposed are destroyed by the rushes.

I made a count of the pairs of ducks seen but think that in final results this should be multiplied by two as in column 2.

	1	2
Cinnamon Teal	34	68
Gadwall	9	18
Spoonbill	6	12
Ruddy Duck	14	28
Redhead	20	40
Mallard	10	20
Pintail	4	8
Total	97	194

~~See~~ Although drakes of various species were seen in some numbers they were not present in the great bands in which I find them below.

I left the Chesapeake about 5 and reached the laboratory about 6. Saw Mr. Davis at the Bear River Club.

The sun was intensely hot today. Mosquitoes were bad during the evening.

June 27 Tuesday.

Water gauge at 7:00 a.m. 1 ft. 4 $\frac{3}{4}$ in.
The river has begun to go down.
This morning the drop was barely perceptible. Last night was warm during the first half.

Later a strong breeze came up from the south and I was glad to pull a blanket on me. The day was very warm but the heat was tempered by a strong south wind.

Mosquitoes were bad all day. They came in to the laboratory on our clothes and we could only kill them on the screens as best we could. In the evening they fairly swarmed in spite of a strong breeze. I went out at dusk and went up the river in the launch. My face and arms were black with them. I could get the motor started. I have not seen mosquitoes so bad here on other years.

I worked at the laboratory all day clearing and embedding some bits of gut and spleen. The new water bath works very well. Prepared my notes for yesterday quite a mass of them. I had intended to go to Corinne tomorrow and visit some

Pectinatus here with great
Massia of floating grass
above it. I walked down
through Seal Pass on foot.
Myriophyllum was abundant
in shallow water.

The water is so high that
the small islands here
ordinarily dry in part are
covered with an inch or two of
water.

The bays everywhere and
the lower portions at the
mouth of the overflows are
flooded so that no mud bars
are exposed. I have been looking
for an area where I might
find shorebirds and so came to
Seal Pass. Half a dozen greater
yellowlegs were the only migrants
seen. Two that I shot were females.
Many male Cinnamon Teal were
in the overflows.

Worked at the laboratory in
the afternoon mainly on the
ovaries of shorebirds. (see notes).

June 29, Thursday

Cooler this morning with a pleasant south breeze all day. The haze has cleared away from the mountains so that they stand out again clear and bold.

After breakfast we ran down No. 2 in the launch to its mouth and then went on down East Pass and through the Rat trail to Klondike. The water ran 7 or 8 inches deep clear to the head of east pass and even at the head we had no difficulty in getting through. There was shallow water here but the mud was smooth and the boat ran over it easily.

Scirpus has made a luxuriant growth here through the abundant supply of fresh water. It stood two and three feet tall all along the banks of the channels. I searched all through the last years growth for seed heads still carrying seeds but found them all empty. The seeds are carried in the heads in many cases however until the middle of May and the first of June. Even now there are many seeds on the ground. The new heads in most cases carry

full sized seeds that are still
green but are well filled out.
This *Scirpus* furnishes food for
the entire year through its seeds.
It is a most valuable winter food
~~to~~ The abundant supply of fresh
water has made a great difference
in the *Scirpus* growth on Klondike
Areas that ~~remained~~ entirely dead or
at best showed a sickly yellow
growth along channels were now
green and flourishing. Dead growth
extended about 4 mile north of the
old wagon. A good current
held through the ~~stagnant~~ channels.

Shorebirds are beginning to
come in. Greater yellowlegs were
fairly common in Peterhead of
East Pass and I saw a number
of lesser yellowlegs. Foxe Godwit was
secured and as many were seen.
These birds certainly do not breed in
the marsh but may nest only a
short distance away. A gunshot
frightened several thousand Willet
from a pond at one side and with
them were numbers of Wilson's
Phalarope.

Small flocks of Wilson Phalarope
have been passing over the marsh
toward this country from the north
since the middle of June and
today they were seen often a

dozen, thirty or forty together flying
swiftly in close flocks, wheeling
over the water but seldom
alighting. Several pairs that were
evidently breeding were seen along
the banks of No 2 and along
East Pass. Near the end of the
Bat trail I stood up to look
out across the marsh and
saw a great flock of shore birds
standing on a pond half a
mile away. We pushed the boat
down for a quarter of a mile farther
and then I got out and walked
across through the shallow water
and rushes toward them. The
rushes were dead here. Scirpus
stems projecting from the water
with shallow open pools here to
three inches deep flooded with a
soft grayish clay, slippery muddy
foot. On coming into the open I
saw at once that the shore birds
were Wilson's Phalarope but not
until a nearer approach did
I perceive their number. They
stood in close rank in the open
water on all the pools within sight.
On one long pond directly in
front of me I counted the birds
in squares of one hundred and
reached a total of 6500. There
were four or five times that many

birds within a quarter of a mile.
~~And how many I thought~~ that
there were somewhere between 20,000
and 30,000. How many more there
were at a distance I had no means
of ascertaining. Later, standing in the
old wagon I could see ~~birds~~ scattered
flocks as far as the binoculars would
carry through the haze.

Piling up some *Scirpus* stalks
washed in here ~~from~~ by some stream
I sat down to watch the birds.
Fewer than one bird in 200 in these
great flocks were males. The others
were females all adults. They
stood quiet at times all facing
the wind and then suddenly
active ran about jostling at
the mud. Now ~~around~~ flocks
were dropping in, alighting,
holding their wings fully extended
for ~~an~~ instant and then
sprung with the others. Small
toe rose and flew a few feet only
to settle again. About protesting
my presence ran through the
masses of standing birds at
times half threatening them with
extended wings. The little Phalarope
broke aside before them leaving
them a clear lane for passage.
Finally walking toward this
flock and forced them to rise

As they left the water I
shot into the flock securing
twelve immediately the air
was full of Phalarope all about
me. They rose and circled
springing & crouching and
then breaking until it seemed
like a perfect ~~storm~~ storm of
tiny feathered bodies.

In smaller flocks I
found a larger percentage of males.
For example in one lot of 300
birds about 25 were males & no
young were seen at all. Evidently
the young must be left to themselves
early while the adults gather in
flocks to molt.

~~These birds~~ Returning to the
laboratory I worked until 7:30 pm
the various of the birds that I
had secured.

June 30, Friday.

Today I worked at the laboratory all day. Practically the entire day was devoted to correspondence and to making out the monthly reports and expense accounts.

Very hot all day.

Cook repaired the pump on the launch today. It has not been working well for some time.

Had Bosley pack up all the skins on hand and prepare them to send in.

Wrote a report on the present status of the duck report.

Expenditures June 1 - 30, 1916.

Amount available at first of month	254.49
Total expenditures	<u>253.57</u>
unexpended balance	.92
Estimated expenditures for July	215.00

Transportation request 9.46030
returned for cancellation.

due item of total expenditures
253.57 above is included 7.51
due on Form 5 to Schramm-Johnson
bill for which is not yet at hand.

Following are items of expenditures	
June expense voucher	188.31
Bosley salary	50.00
Trans. requests	1.70
Schramm-Johnson Form 5	6.05
" " due	<u>7.51</u>
	253.57

July 1 Saturday.

Temperature at 4:20 a.m. 53° +
water gauge 1 ft. $5\frac{1}{2}$ inches.

I got up at daylight this morning and started for Corinne in the launch. Near Henderson's the boat broke down so that I could not make it. Came back to Kundsans and then waited for the Harpers and rode in with them, sending Bosby back with the launch.

The early morning was fine and cool. I was surprised to see how low the temperature went. As soon as the sun rose however it was intensely hot almost at once.

At Kundsans Clubhouse I found a mud wasps nest built in the ^{end} of a clothes of a clothes hook  that was screwed in the wall. There were a number of Myotis in here and I collected one young one.

Across from Kundsans' water in North Bay has come out for a long distance across the flats.

The ride in to Corinne was without particular incident. On town I certified to my monthly expense account, got the mail and then returned. Was at the

laboratory again by noon.

In the afternoon I went down Channel 1. Not many ducks in here now. I collected a few shorebirds. Water has raised all along here an inch or more.

Returned to the laboratory and worked until 6:30 or ovaries of shorebirds collected.

Mosquitoes continue to be very bad but ~~black~~ buffalo quats are fewer in number, though still abundant enough. There were many mosquitoes I found in the grass near the mouth of no. 1.

July 2, Sunday.

Water gauge this morning 1 ft 5 1/2 inches. Clear and hot until about 5 P.M. I worked at the laboratory all day. Cook fixed up the engine in the launch in the morning.

About 4 I walked up along the willows to the end of my enclosure but saw very few birds. Foxtail heads are ripe now and fasten in socks causing considerable annoyance. The bearded wicks work in through heavy wool stockings and go clear to the skin.

In a small sandy area near the laboratory is a colony of peculiar solitary wasps with broad flat bodies. Males have the abdomen banded with pale green females with gray green. The females had numerous burrows around in the sandy soil and were digging in them. Alighting near the entrance of a burrow a female would throw a steady jet of sand grains out between her feet behind the sand flying to a distance of four inches. The fore tibiae were heavily spined for this labor and all digging was done by them. After digging an instant at the entrance they would back up quickly a few



"Oswald, your neck is dirty."
—Yale Review

Oswald.

July 2. 1916. Today Oswald has been trying to fly again and is making fair headway. He stands waves his wings and then runs out across the flat for forty or fifty feet. At times on the last jump he leaves the ground for ten or twelve feet. For three days he has been able to fly to the top of one of the experiment pens a height of three feet.

This afternoon there was a severe windstorm, so strong that he could barely stand against it. Once or twice it caught his wings and nearly overturned him. He refused to stay in the lee of the house but walked out facing the wind (west) and got out in the shelter of the willows.

For a while he has played for a few seconds at a time with sticks. This morning he was very friendly. Finally he picked up two or three bits of willow arranged them and some rushes around in his box and then settled down exactly as if on a nest. Now this bird may be a female and if so we may have a sex stirring (as in erect penis in male children). That prompted the bird to simulate nest building and incubation.

The dog came over this morning and Oswald promptly

drove him into the willows.
Tonight it was raining and
I fed him inside. He was greatly
excited and after each meal
waved his wings wildly with
feathers on end and outstretched.
Heck calling raucously at you,
ee yot instead of the usual
mechanical Kack Kack Kack. Afterward
he drank from the dipper.
On the evening he sat on his
box perch and suddenly drew
up one foot and stood on one
leg for a long time. He has never
done this before.

He spent much time preening his
feathers tonight. On doing this
he works the point of the bill for
several seconds in the powder down
patches on breast or back and
then works at the bases of the
contour feathers stripping them
out through his bill. This he
has done since June 21. His
plumage is very fine now and he
is very graceful.

Mosquitoes bother his legs
considerably and at times he raps
one foot smartly on his perch to
jar them off. He picked them off
too and today caught several
on me and swallowed them.
He watched them light on me with

marked interest

After a thorough preening he goes to sleep standing on one leg. In sleep the neck is drawn down and the head laid in the fold between it and the breast with the bill pointing straight down, and the top of the head at a right angle to a sagittal line even and in the same plane with the wing. The feathers fluff out and cover the eyes completely.

The eyes are closed the upper lid being brought up across the eyeball.

When he awakes he stretches by extending one leg at a time behind and then showing the wing of that side out over and beyond his foot. This done on both sides he stretches his neck out and then down bringing his body parallel to the earth and cocking his tail in the air.

He has the habit of standing with body at a right angle to legs at times especially after roosting.

He walks now with no unsteadiness at all.

July 3. Monday
Water gauge at 16:30 a.m.

1 ft. 6 in. Temperature 50°.

Very cool and pleasant this morning.
The mountains stood out clear
and bold and islands in Great
Salt Lake were clearly visible. It
remained cool until after noon.
After breakfast we went out 3½ in
the launch. Many *Common Loos*
still in pairs were in the flows.

Water in the bay was deep
7 or 8 inches was the average
throughout. Toward the west
side the water was clear of
grass and we went on down
to Slaughter Point without difficulty.
Hundreds of great carp were feeding
here in the shallow water.

Very few ducks were on the
bay. Flocks of *Common Loos*
and Pintails drakes were in the
head of the bay and Pintails in
small bunches passed continually.

[We crossed to Slaughter Point
and worked rapidly through the
rookery banding all young birds,
Snowy and great Blue Herons that
were large enough. In all one hundred
bands approximately were used.
Young birds and Snowy Herons still
unable to fly worked in out
ahead of us and were caught

two or three at a time banded
and released. [Elvis were tame enough
and seldom objected; when released
they often walked away for a few
steps sedately and then turned
to watch us. Snowy Terns
were vicious and struck and
squawked at us. My left hand was
bleeding in a dozen places when
we were through.]

On the south edge of the
rookery I suddenly stumbled upon a
sick pintail a drake. It lay
at the edge of the rushes and
tried to flap away by aid of
its wings. Not far away was
a dead Mallard and a pintail
dead within three or four days.

We ate lunch on Starvation Point
and then went up down the
Starvation Island working the
island and the shore line west
for two miles. I picked up a
male Redhead and a pintail sick
on the island and saw dead
a female Redhead and one young
4 days old. In the water at a
short distance lay a dead
goose immatures. The dead
birds had died apparently the
night before as they were still
in rigor mortis. All had
died of the duck malady.

Further on along the shore we
picked up a Redhead half grown.
Two dead cots were seen and
two dead Mallards. Two cots
were seen affected and two
sick about picked up.

The water here was
shallow and clear. No
Potamogeton grows from a point
100 yards east of Slaughter
Island in west indicating
strongly brackish conditions. Ordinarily
the water is fairly fresh but
a slight south wind brings
in salt water. The bottom sand
is salt.

If an organism (bacterium
or protozoan) is responsible
for the trouble, it is one that
requires brackish conditions for
its existence and multiplication.
Fresh water must destroy it or
render it innocuous.

The feces of the young Redhead
were fed, strongly so. The others
were not abnormal in that
respect.

Two or three hundred immatures
about are feeding in here and
it is liable to go hard with them.

We left about five and went
in up the bay. Reached the gun club
about six thirty.

Received instructions this evening
to do no ~~field~~ work on duck
diseases until further notice but
to occupy myself with food
of ducks & shore birds, duck census
& survey of food plants.

July 4, Tuesday.

Worked at the laboratory this day until 3 P. M.

The two Pintails brought in yesterday were put in with the ducks in pen 15 (nick. mark) and this morning were swimming about with the other ducks.

The Redheads when brought in were unable to stand or move about & placed them on a sheet of paper on the laboratory floor. ~~The~~ Red Pintails, Redheads and About all have absolute paralysis of the membrana nictitans. The Pintails when secured seemed "pop-eyed"; a characteristic appearance in sick birds before there is much mucus discharge from the eyes and due apparently to swelling of the Harderian glands.

The Redhead both had severe mucus discharge from the eyes. The adult was unable to hold up his head for more than a few minutes at a time. For the greater part he lay with head extended before him on its side appearing as if dead save for his breathing.

On giving him water I use a funnel tube with a five inch stem. I cut down a ten inch tube in making this

and rounded the broken edges
in a plane. I put up his head
open his bill and insert this
gently in his throat pushing it
down until the base of the funnel
comes between the two halves of
the open bill. Then I pour water
in slowly until the funnel is
half full. Usually it is necessary
to pull out the skin of the
neck ⁱⁿ front and work it
back and forth slowly to induce
swallowing. When the funnel is
empty fill again. When again
empty pull the tube out
but still hold the head up
until it is certain that there
is no water in the throat. If
the head is dropped at once
there is danger of water flowing
forward and flooding the
epiglottis.

For the small Redhead $\frac{1}{2}$
grown I used a ^{$\frac{3}{4}$ inch} medicine
dropper. This I inserted in
the throat until the bulb
came between the mandible and
then squeezed out the water
and withdrew the dropper. This
I filled and emptied twice. This
Baby Redhead improved rapidly.
By afternoon it was attempting
to clean itself up. It was

able to move the head over
the back and manipulate its
feathers but could not bend
the head forward and control
its movements to preen the
breast though it made many
attempts to do so. This indicates
paralysis of ~~nerve~~ muscles
forward extensor muscles. The
legs and wings are also partly
paralyzed.

On the evening of attached
a "party" at Wells.

Mosquitoes around the Bear
River Club guide house ^{were} ~~very~~
extremely vast. There were ~~only~~
cows and ten calves in the enclosure
and they kept running about
nearly frantic with the insects.
Each time they passed the door
more mosquitoes were added to the
hungry hordes attempting to get in.

July 5, Wednesday.

This morning I was up at five and left in the launch with Bosley for Corinne at once. It was intensely hot on the river and in all day though the tide on the river in the early morning was cool and pleasant.

Many pairs of Cinnamon Teal were still on the river and I saw eight or ten pairs of Gadwall. Two broods of mallards just to fly were noted and one of Cinnamon Teal. Broods of young Red head Gadwall and Cinnamon Teal were noted. I shot a pair of Blue-winged Teal securing the two for one discharge.

In Corinne I mailed some packages of specimens and on express boat talked for a few minutes with Mr. Clarence Gehney and Mr. Evans.

We hired a horse & buggy from Mr. E. R. Hadley and drove down through the slough west of Corinne to make a survey of Duck pools and see what Ducks were present. These sloughs in the main follow the course of the river and are oxbow loops that have been cut off for a long

from the main channel for a
long time. Some of these are probably
old channels left when the river
has changed its course in part.
The first of these sloughs
known as the Town Slough lies
on the outskirts of town. It is
a body of open water with
a considerable growth of Potamogeton
pectinatus in it. The banks are
well pastured. This water lies
too near town to be much frequented
by water fowl.

West of this lies the Judge's
slough connecting with the
town slough and near it. It
is similar in character to the
town slough.

At the bend of the river below
Corinne is a small grove of
boxelders and willows known
as Myers grove. To the east of
this is Horseshoe slough more
than half a mile long.

In this an old oxbow loop
are growths of round Scirpus
(394) growing
abundantly. A Potamogeton (386, 395)
was abundant also
its leaves floating on the water
surface in part and in part submerged.
In some places this had thrown
flower stalks. This plant grew at

The borders of the ponds as a fringe. Potamogeton pectinatus was very abundant growing everywhere in the water. With it in shallow water was much Myriophyllum (418).

Shallow water and the fringing shoreline were covered with growths of Scirpus americanus. On either side of the slough were alfalfa and grain fields. Salt grass Distichlis spicata was abundant near the water's edge. Large areas were grown with Hordeum jubatum furnishing abundant seeds. Scirpus (403) was abundant.

On the dry banks of the sloughs were Milkweed (390), Mellilotus alba, Lactuca integrata, Lactuca pulchella, much pigon grass (367-368) and the Chenopodium. All these were abundant. Common were Xanthium echinatum, Erechtys asper, wire grass (391), covered large wet areas.

Mellilotus officinalis was fairly common, there was some rose (387), Phragmites, and Utricularia strigosa. Helianthus multitalis were found.

The following were common in
the growth on dry banks above
the sloughs.

409.

405.

396.

393.

392.

388.

385.

406.

408.

a rye grass (389)
grew in clumps in wet localities.

a primrose (401)
was common in the fields on either
hand.

(402) A small foxtail like grass
formed
a mat in some of the poorer
drier soil. Already it was burned
brown in the sun.

The following were fairly common.

399.

400.

404.

407.

410.

On some knolls here
further west on unbroken ground
was a low scattered growth of
Eriogonum vermiculatum. I saw
a few cactus (Opuntia sp.)

scattered about among these shrubs.
Alkaline flats were covered with a
poor growth of *Salicornia rubra*.

Beyond here we came to
two more sloughs known as
Long Pond and Shallow Pond.
Vegetation about them did not
differ from that described for
Horseshoe slough.

Still further down was
a very deep oxbow loop known
as Dead River. The two ends of
the ~~Horseshoe~~ river were separated from
the river by only a narrow space.
About this slough was
considerable growth of *Salix*
Guygdalesoides with some *S. exigua*.
The wild rose here formed dense
thickets. I saw a number of
plants of *thistle* and a *lygum*
1398

fairly common. With the addition
of *Radicula hispida* and *Tissotia*
sparsiflora (local) the vegetation
was like that of the other sloughs.

On general these sloughs
show plainly in their more
varied vegetable growth that
they are fresher than the
areas in the delta of the river.

Returning to Corinne once more
we drove out another road to
the Flume pond. This is a
shallow depression filled partly by

irrigation, surface and partly by
a spill from the Bear River canal.
At Bay Benatti a bluff 40 feet
high. The surface of this was
crusted with alkali that
had washed out and the
pond and its shores appeared
strongly alkaline. *Sarcophaga*
americanus and *Distichlis spicata*
were the most characteristic growths.
With the usual *Salicornia rubra*,
Veronica recta, *Rumex*, *Chenopodium*
etc.

Bosby tells me that sick
ducks were abundant here in
1910, 11 & 12. Some of these birds
were brought up to the town
sloughs just beyond and it
was supposed that they recovered
as they disappeared. Dick ducks
were known in another pond
called Salt Pond below here but
not in the town, Judge or Kowichor
sloughs. Long & shallow ponds & the
Dead River.

We left Corinne for Duckville
in the launch about six and
arrived about 10 minutes of nine.

July 6, Thursday.

This day I spent at the
laboratory looking up notes,
plant specimens etc.

Webb is talking of introducing
cattle into the inclosure here.

This day Bosely dug holes
for a cross fence that will
cut us off from the upper part.

Davis has now 2 cows and
eight or nine calves down here
pasturing at present about the
guano houses.

July 7, Friday.

Temperature at 6:00 a.m. 72° -
The sky was lightly overcast
all day. There was little breeze
and the air was damp, a
combination of conditions that
made the heat almost
unbearable.

After breakfast we took a
lunch and went out $3\frac{1}{2}$ in
the launch towing a rowboat.
There were about 200 Cinnamon
Teal gathered near the mouth
of $3\frac{1}{2}$. About 100 mallards
were a little farther out in the
Bay. Pintails all drakes were
common in small flock. About
500 were seen during the day. One
young bird was picked up dead
and my female was found.

Redhead have almost disappeared.
A dozen pairs and a few young
were the only ones seen. Two
or three male gadwall were noted
with small flocks of Pintails.

We crossed from the end
of the channel directly to Slaughter
Island. The channels were fairly
clear of Potamogeton here and we
had less trouble. The intense heat
of the day raised a large amount
of Potamogeton and large areas were
covered by mid afternoon that

were clear in the morning. The
water through here ran right to
ten inches deep.

On Slough Island I
found one sick Redhead a
female. This bird showed the
characteristic paralyzation of
the membrana nictitans, it was
thin in body and quite
active and was I think one
that sickened at the same
time as the others found on July 3.
One sick coot was noted but
nothing else. No dead birds were
about. Apparently there was a
sudden outbreak here that
was as suddenly as it began.
Great flocks of Shorebirds
were feeding in here. I killed
two of these Western Sandpipers
here with two shots. About
were abundant of sand godwits
Dowitchers, & least Scaup.
We returned to the laboratory
at 3:00 and I worked until
dark in the birds secured.

July 8, Saturday.

Today a South breeze lifted
the heat so that it was not
so oppressive as yesterday.
After breakfast I went out
Bromis Overton and made
a survey of the plant life that
might serve for duck foods.
The most important was
Potamogeton pectinatus that filled
all the bays. There was
considerable Myriophyllum here
too. Scirpus americanus was
abundant. Great areas were
covered with Distichlis
spicata and with Hordeum
subvatum. The latter now is
opening its seeds. The
hard seeds are blowing about
every where. Masses of them
water soaked are in the water.
These seeds are mischievous
things that work into my
socks and scratch painfully.
Once started the joints work
in through. Baccharis maritima
was abundant. There were great
growths of cattails. Salix
amygdaloides comes far down
the overflow. Salix exigua was
less abundant. The latter prefers
drier localities than the black
willow. Ranunculus acris

and Rumex even very abundant.
There was much Pigmy grass
and Chenopodium. The Plantain (384)
was fairly common. Lactuca
pulchella was in full flower among
the willows.

Returned via Kundsams # 2.

Mr Browns & Kundsams were
about 150 Mallards - mainly
young and 250 Common Teal.
Returning I ran out the Kendall
Canal.

Along the shores were
Distichlis spicata & much Puccinellia
maritima, ~~and~~ S. The grass
was sprinkled with Lactuca
integrata. I saw also Melilotus
officinalis, Broad leaved big flowered
Asclepias (see 390) and Radicals
hispidus. I collected an inch
plant (# 417)

that I have not seen elsewhere.
A floating pondweed (414, 415
) was found here that
I have not seen before. At the
mouth of the canal
is a big bed of Phragmites
phragmites. Scirpus americanus
stood here in great growth
5 feet tall.

Mallards were nothing in here
in abundance.

Set traps for fence this afternoon.

Rubbing the powdered down patches on Oswald imparts to my finger tips a smoothness equal to that given by some skin cream. There is nothing greasy about it, but it makes the skin (roughened by work and hard water) smooth and pleasant. On old skins the powdered down are very greasy but in this living bird they are almost dry. Oswald uses them in preening his feathers entirely and has since I first noticed them (about June 21). An oil gland is appearing now (first noticed July 7). I can feel it as a small lump apparently the nipple that is firm and smooth to the touch. He allows rubbing of this and the powdered down patches without seeming pleasure but objects to other petting. Only the domestic dog and cat allow promiscuous fondling and that comes perhaps from long familiarity with man's caresses. Few wild animals when domesticated care for indiscriminate petting and stroking. The early use of these powdered downs and their appearance before the oil gland might indicate that they are a primitive structure.

developed ~~these~~ for the care of
feathers long before oil glands
appeared. This would go far to
explain their appearance in
isolated groups with ~~but~~ no
apparent relationship. As ~~an~~
primitive character they might
show some carrying power or
potency of inheritance & crop out
apparently at random.
It will be interesting to examine
young herons & see how early they
appear.

July 9 Sunday.

Cool and pleasant this morning.
Had a swim this morning
early and found the water cool
and bracing.
After breakfast I went part way
out 3 1/2 taking Dr. & Mrs. Part who
are down for the day out with
me.

Today we stretched the
wires in our fence. It was
not such hard work as I
had imagined.

Oswald begs to come inside
every evening when the
mosquitoes get bad. I bring in
his box and he sits in it
or his wood box where defecations
will not white wash our floor.
Last night he seemed full of
life. Everything in sight was
scrutinized with craning neck
and alternately raised and
depressed crest. Finally he seemed
to feel some growing interest
to hunt within them. He stood
watching alertly beneath him
as though waiting for fish in
some pool. His neck was extended
and withdrawn and his head
turned from side to side with
nervous intentness. After a minute
spent thus his head would

start out and he would touch
a nail head with his bill or
seize for an instant the side
of his box. I tied a bit of
wood on a string and ~~threw~~
threw it to him. He struck at it
several times and finally seized
it. Then we played for some
time, he catching the wood
expertly as I swung it to him
holding it and then releasing it.
Finally he got down on the
floor and I snapped the
stick out to draw it back in
little jerks. This excited and pleased
him greatly. Sometimes he crept
out stealthily toward it. Then
again waited until it drew
near and then struck it
swiftly.

The oil gland has grown somewhat
but he makes no effort to use it.
At dusk he likes to come over
and perch near me and have
me ~~for~~ rub his powder down
gently. When displeased
by mosquitoes or by something
he shakes his head opening and
closing his bill with a low rattle.
Or at times seizes my fingers
gently and pushes them away.
He catches mosquitoes in his
bill and then tries to swallow
them. He watches these insects

intently and even reaches
over to pick them off my clothing.

Tonight several times he
seized my trousers leg and
shook it ~~and~~ playfully.

In defecating if the cloaca
is full he bends forward and
shoots straight out behind.

Of ~~the~~ excrement is mainly
urinary whitewash as it is in
4 cases out of five. The posterior
portion of the body is elevated
and brought down with a
sharp jerk so that the last
of the fecal matter strikes between
his feet.

He strikes his feet one upon
the other to jar mosquitoes away.

He has brought up a good
many twigs about the floor
and when I play with him
arranges and rearranges them
calling Kik Kik Kik constantly.

On the dusk I find that
his eyesight is not very good.

This afternoon I examined a
sick gull but in the grass
and Oswald was much interested.

He ran up and then stood watching
intently beside me. I thought at
first that he was going to strike
it but he paid no attention
to me.

He shows a keen discrimination
between people. He likes me very
much and permits me to handle
him and do various things.
Ray he tolerates. Others he will
have nothing to do with but
runs up and squawks and
strikes at them. Though
accustomed to Joe still he does
not like him. When strangers
are about he is bound to get
at them. I stand between him
and visitors and he cranes his
neck around + tries to get past
and get at them.

July 10, Monday.

Very hot this morning but cooler
this afternoon with a pleasant
breeze. Water gauge 1 ft 8 1/2 inches.
I worked at the laboratory
all the forenoon and part of the
afternoon on plants and plant
survey notes. The rest of the
day on general notes.

Dorley did odd jobs, fixed the
water gauge, finished the fence etc.

Oswald was much excited
this afternoon at a frog that
Ray brought in. He seized
it and shot but was
afraid and would not eat it.
When he dropped it Ray picked
it up and Oswald seemed
afraid to have it near him.
It stood up waving his
wings and calling and finally
tried to get out the door.

Toward evening the frogs came
over and Oswald watched
them closely. He was half afraid
several times threatening to
attack them and then retreating.
Toward evening he made a
long flight of 300 yards.
Returning he alighted on the
laboratory.

This morning he discovered
the river and stood watching

intently in the water for an hour. Occasionally he wet his bill and withdrew to resume his intent gazing. When I came near he retreated as though afraid that I would put him in.

I fed him now morning and evening and give him water after each meal and at noon. He drinks half a dipper full each time. I give him this amount in two portions. Otherwise he chokes.

July 11, Tuesday.

Water gauge at 7:00 a. m. 1 ft 8 $\frac{3}{4}$ in.

Very hot all day with little breeze.

Sky clear.

After breakfast I went down Channel 2 and across into East Pass.

In the lower part of Channel 2 there is considerable growth of Potamogeton pectinatus leaving only a small channel. East Pass and the bay across to Muck Point was covered with Potamogeton and the yellow moss. This plant growth has banked up the water and save at the mouth of the overflow it was clear.

I searched the rush stands in East Pass but found nothing until I got down to the Pass leading to Davis Island. There I found one sick Pintail lying in the water. There were two dead Redheads here (a male and a female) and one dead coot was seen.

would be a pleasant place
to spend a week.

The fish hatchery is supplied
by a spring of clear cold water.
Rainbow trout are raised and
sold in the market for food.

From Mantua we went on
up to the hill above Dry Lake
half way to Logan. The character
of the vegetation remained about
the same. Here we were

east of the first range of the
Wasatch. The hills were as
steep on this side as on the
west face so that the front
range is a knife like hogback.

Returned to Brigham City
supper, then to Corinne. Arrived
at the laboratory at midnight.

July 13, Thursday.

Very hot all day today. The wind came from the west so that there was no draft in the laboratory making it seem warmer than it really was.

This morning I unpacked and checked up the binocular microscope that came yesterday. Started some histological material through the alcohols.

I found something wrong with the focussing attachment on my binoculars and was two hours in remedying it.

Later in the afternoon I sent Bosby out No. 3. He reported a large number of chucks. Many of them flappers. I brought in one dead greenwing dead from the duck smut.

I did not get my material all embedded until about ten in the evening.

July 14, Friday.

Water gauge this morning 1 ft 11 1/2 in. The water is dropping rapidly and bare muddy shores are appearing along the river banks. The bottom further out in the river I find is hard and firm.

The sky was fairly overcast this morning and the air was fairly cool with a south wind. Went out 3 1/2 in the launch and then in the rowboat worked from the head of the bay to Langley's Island along the rushes. The water was very deep all along here and in some places was over my boat.

A great many ducks have come in recently. At least five thousand Pintails are on South Bay. So far as I can tell all are drakes. Some are still only half in eclipse. About 500 green winged Teal were seen today in addition. On the rushes along the west shore were great numbers of flappers. A considerable number were out in the open water. As I came near they went into the rushes like so many little steamers each duck throwing water with feet and wings. A bank of ducks mainly Pintails with a few green winged

Teal, Redheads & Spoonbills, extended across from Slaughter Island to Ladies Island.

I saw one Sick Pintail that I could not catch and found another on Slaughter Island. The following dead birds were seen

Redhead # 3

Pintail # 4

Bluebill 1

Mallard 1

Coot 2

Ruddy 2.

Call 2 dove on coot & one Pintail lay on Slaughter Island.

About four P.M. a heavy wind ~~and~~ accompanied by a slight fall of rain came up from the south. Before it struck about 1000 crows came in from down the bay and dropped in behind Slaughter Island and the bays inland were they were sheltered. Others came in during the early part of the storm. Northern Phalaropes seemed to mind it little as they continued to fly back and forth. The water rose almost instantly near five inches and poured back in through the bushes.

After watching the storm pass up along the

Promontory Range we rounded out
and started home. We crossed
two short bars forming a triangle
and spread a bit of canvas
on them. With this under sail
we came up to the launch
in about 35 or 40 minutes.

July 15, Saturday.

Sent Bosley to Corime today in the camel for supplies etc.

This morning the sky was heavily overcast to the southward and about eight it began to rain continuing until eleven as a steady downpour that rendered the flats muddy and slippery as usual. The barrens that when dry are encrusted with alkali need a slight amount of moisture to soak them up and render them suitable. mudholes. This mud is slippery so that walking is difficult and clings to one's feet like true gumbo.

About two in the afternoon it cleared and the mountains stood out clearly all around.

Mosquitoes were extremely bad all day. Whenever I went out clouds of them hung to me and many came in on my clothing so that I was fighting them inside all day long.

I worked at the laboratory all day.

Under the bridge a great school of chubs (*Lepomis lineatus*) was jumping all day. They lie in the water below the surface and rise rapidly with a spiral breast water at the surface and

Then go down again. This makes a sucking noise rapidly repeated. I have noted this all three summers that I have worked here. The water is deep there and swift. The fish are wary and just when any one passes the bridge I throw in a line and caught one when the others disappeared nor could I get another bite. These fish were of all sizes from minnows up to full grown.

Lowell was much interested in them and spent most of the day standing on the bridge and watching them intently. He crossed to the opposite bank where he could reach the water. I do not think that he managed to catch any. I caught one and it flapped on the bridge. Instantly he flew up pounced on it and swallowed it with great excitement. I fed him half a dozen getting him spear them in a pair.

On the evening he was rather wild and flew up on the house ~~where~~ and would not come down.

July 16, Sunday.

Very warm today but the mosquitoes were quiet so that I was hardly troubled at all. After yesterday it was a welcome relief.

In the morning we prepared a platform pen for four chickens bought yesterday from Fred Hansen. These I will use in some experiments. For them I used plain platforms without a hole but for a chicken two platforms were completed for them. This work and other odds and ends consumed most of the forenoon & early afternoon.

Wrote and read for the rest of the day.

In the evening visited at Sackett's.

This morning when I awoke Oswald was on the roof of the Clubhouse outside my window. Later he walked up on the ridge and finally flew across to the laboratory where I fed him. Then he disappeared and I thought that he had left for good. Late in the evening however he returned to roost. He was rather wild all day.

July 17, Monday.

water gauge at 6:30 a.m. 1 ft. 11 1/2 inches. temperature 66°. The sky was overcast part of the day and we had a slight sprinkle of rain. Last night there was quite a shower in the middle of the night. The downpour was accompanied by a heavy electrical display.

In the forenoon I went down to the mouth of No. 3 in the canoe. There were many ducks gathered in here; several hundred Green-winged Teal were seen and in the grass and rushes were numbers of Green-winged Gulls. I shot two of each male and a female. From examining these I find that the primaries & secondaries are shed while the coverts & tertials remain (save for a few) for a time longer. One of these birds had the flight feathers just appearing as blunt ended pencils while the coverts and tertials were almost intact. The wing has a curious shortened look. On both sexes wing claws remained on the hallux.

I found a dead Pintail and a dead Cinnamon Teal both adult males. No sick birds

were seen.

A young young and a young Richard were captured. Eulicomic rubra while making its growth is a bright ~~vibrant~~ green with a hint of gray in its color. As it ripens it turns a beautiful dull red thus meriting its specific name. The plant during growth is fleshy and succulent. The pulp has a very strong saline taste.

Until five o'clock the laboratory was intensely hot. Then the wind shifted north and it became cooler. Oswald was not about when I came over first but appeared after breakfast. I caught two Chubs for him.

Then he was gone until 5:00 P. M. I was sitting in my window reading when I heard him call. Looking out I saw him descending from a flight about 40 feet in the air and crouching and hawking as he came. I went out and he seemed most glad to see me. I sat down and he built me of his stick nests stopping to seize my fingers gently with his bill and calling Kik Kik

(the food call) constantly. Frightened
with his sticks he crouched up
close to me expressing great
pleasure apparently at a little
companionship. I began fishing
for chubs and got them to
him as fast as I caught them.
He seems afraid to be near
the river when I am on the
bank and stays back near the
laboratory. At the sight of
such fish he came running
up with flapping wings
struck it with a loud
sharp squawk and then
swallowed. Six good sized fish
he got away without trouble.
The seventh stuck in his throat
several times and was regurgitated.
I had to give him a drink of
water before he could get away
with the eighth and the ninth
he refused utterly. He picked
it up & carried it about
but after several trials at
swallowing shook his head
from side to side violently in
disgust and then merely
sat looking at it.
Absolutely filled up he
walked over and flapped up on
a pin. He remained there until
after supper when the wind

flushed and he went into the
willows behind the laboratory
for shelter.

He is beginning to hawk a little
now and giving only the first
part of his crow. Kamp-Kamp-Kass
Kam Kan is the full crow
~~Now he~~ — — — — — Now
he abbreviates giving only the
first three.

July 18 Tuesday.
Water gauge at 5 a.m. 1 ft 11 ³/₄
temperature 55° F.

Today was an exceptionally clear day with the mountains far to the south standing out bold and prominent. Directly over Fremont Island beyond Stansbury Island lies a range of mountains that is called the Aguin or Stansbury range by some while on the land office maps it is given as the Unaguin range. Three peaks show together the highest of which must be Black Mountain. Great snowbanks were plainly visible on its northern face today.

The Promontory Range stood out in all its barren grandeur. Squares of dry farm wheat stood out marked as clear patches of brighter color by the ripened grain stalks. Elsewhere was the plain greenish gray of slopes covered with Sagebrush varied by brown, brown red and purple of rock and shadow.

The Wahaatch from Brigham north to the narrow gap where comes Bear River into the Valley resembles some huge reptilian creature. Crouching along

with its head to the north.
Along its giant sides great
ridges of rock - barren of trees
stand out like huge ribs beneath
a naked corrugated roughened
skin. An animal half submerged
in the plain of the valley is this
~~world~~ so monstrous that it is
revealed in outline only detail
being too immense for the
eye to grasp.

After breakfast we went
down 3 1/2 and crossed directly
to Slaughter Island. The air
was clear and tonic and
the whole day pleasant and
enjoyable. I took several pictures
of the way to the south
in an attempt to show the
mountains. Antelope Island
stood out clear and beyond it
the Ogish Range with the
smelter at Garfield throwing a
long streak of smoke clear
to the Ogden notch in the
mountain side.

On Slaughter Island I found
the following dead

Redhead	1 young
Buddy	1
Coot	3
Avocet	3
Spoonbill	1.

Crossing to the mainland we
 worked the shore line for about a
 mile and a half. Receding water
 had left a bare strip of mud
 from 100 to 300 yards wide to
 the westward. There was a good
 many dead birds here viz.

Coot	7
Redhead young	4
" adult	4
Ruddy	3
Avocet	37
Pintail	8
Mallard	1

The water has washed in
 here in some south storm in
 the last few days and all these
 birds have been washed about
 Most of them appear to have
 been swept in from the bare
 mud in front.

We secured 2 female Redhead
 4 Avocet + 2 coots alive.
 Practically all of the avocet seemed
 immature.

July 19, Wednesday.

Worked at the laboratory today
all day. Had breakfast a little
after six and worked twelve
hours a large part of the
time at the microscope.
fairly cool today.

July 20, Thursday.
got an early start at the
laboratory again today and
spent all day in examining
blood etc.

I find that H_2S is
a gas is a strong poison
that it affects the nerve
centers and causes conjunctivitis.
This will be something to
experiment with as this gas
is abundant here in the marsh.
Have planned a box in which
birds may be subjected to the
fumes of this poison.

Oswald came back last
night for a short time ate a
couple of chubs and then left
again not returning to roost.
He was a little wild tonight.
This bird is distinctly smaller
than other Hrons. Something must
have been lacking in his food.
He flies easily and readily. He
has visited Sacketts a mile
below. He is much interested in
the chubs in the river and
stands on the bridge watching them.

July 21 no Oswald tonight.
July 18 I brought up another
Great Blue about half grown and
Oswald squawked and stuck at it.

July 21, Friday.
Worked at the laboratory again
today.

Very hot.

Arranged some new experiment
pens etc.

Day gave the young Great Blue
Horn I brought up July 18 this
and then injected carotids and
jugulars with a 1% solution of
Methylene Blue in warm Normal
Salt Solution. Preserved the head
& neck for further dissection & made
some notes & one drawing of the
viscera

July 22, Saturday.

Very hot today. Went out 3 1/2 and crossed to Slough Island and was out all day.

I collected seven jars of black mud today that contained a large proportion of SH_2 . This gas is found in pools of clear water. The surface mud in them for 1/4 to 1/2 inch is thin grey mud. Below this is a layer 1 to 4 inches thick that is very black & contains a large amount of decaying organic matter. This when stirred up gives off a strong odor of SH_2 . One jar was taken from the south shore of Slough Island. Three others were filled near Neely's Island. Here for a large area the surface mud is grey white underneath is a stiff clay layer 2 to 6 inches thick that is black in color that gives off a strong odor of SH_2 .

On the main island I collected three more jars in small pools among bulrushes. On one the insect life, Chironomid larvae, Corixid etc was dead presumably from the effects of this gas. And I forgot amber glasses today from between the glass of light from the water, the intense heat

and constant smelling of SO_2 &
was rather sick at night.

July 23, Sunday.

Was at laboratory all day today
worked on birds secured yesterday
and notes.

Company in late afternoon &
evening prevented further work.
Very hot.

July 24, Monday.

Worked at laboratory all day on
notes & specimens.

This is Utah's Pioneer Day a
holiday for all.

July 25, Tuesday.

Rather warm today.

Went out Bromis overflow in morning. There were 75 or 80 young ducks at the mouth of the overflow and we caught a number taking off our clothes and going in after them as it was too deep to wade. Young ducks will dive remarkably to stand or walk when they get ashore.

Worked a laboratory in afternoon.
Visited at Sacketts this evening.

July 26, Wednesday.

fairly cool today with sky overcast
for part of morning. The wind blew
violently from the southwest nearly
all day. Wind from this direction
shakes the laboratory but since
blocking up the sides and building
the store room on the west I
find the building much more stable.
In the forenoon I went out
with Knudsen #1 and put in the
forenoon with Bosley in catching
some young ducks. We secured 14 ducks,
gadwall, Spermill, Pintails and Mallard
and two coots. I have borrowed
a fine meshed seine 120 feet long
from Fred Hansen and this we
stretched across the overflow near
its mouth raising it two feet or
more above the water by means
of ~~poles~~ willow poles. Going below
the boat up along a small channel
while Bosley worked down a larger one.
I drove up about 75 ducks on
the first drive and captured four.
On the next drive I got five and
so it went. Many of the young birds
ran out and hid in the grass and
rushes. We stripped off our
underwear to chase the birds but
were forced to put on shirts to avoid
sunburn. The young birds swam
up to the net and along struggling

to get through and then when
their heads caught pulling back
until they were free. An occasional
one dove and became entangled
but came to the top at once.
These I captured. Others doubled
back after one trial and escaped.
Bosley got just as not many
ducks were down his way.

The young cinnamon teal became
caught in the net during my
absence and was drowned.

Returning I saw a ducks
head floating in the river at the
Bear River Club guide house. I stopped
and after some trouble in the
wind it was picked up and
another with it. The two heads
were those of immature mallards, a
male and a female. Both had
been cut off and on both the
blood had just coagulated. Clyde Webb
evidently had mallard for dinner.

In the afternoon I worked
at the laboratory. Bosley goes to
Corvallis tomorrow so that I
had to spend an hour and a half
or more in getting out some
correspondence and reports. An
express box of skins, one of skeletons
& mail packages containing Bird
stomachs, old boots to be condemned
and exposed Kodak film were prepared.

I sent in Gries' catalog
after checking it over.
Fred Hansen was here in
the evening. He tried to fish
today but found the wind
entirely too strong.

There are very few mosquitoes
now. In fact they hardly
bother around the laboratory
at all.

Usually we had have drifted
in during the day in our
clothing and then have hidden
away in corners. ~~At~~ Three
days ago Boshy brought in a
small Myotis and I released
it in the laboratory and forgot about
it. This morning it fluttered to
the screen door and I released it.
It had chased out the mosquitoes
completely together with a great
host of chironomids that had filled
the windows.

Saw a Monarch butterfly
today. Vanessa antiope is fairly
common. These butterflies have
local habitats that they frequent
for days at a time. At present
for a while there has been one in
the willows upon my windows
and another at the east end of
the bridge. I saw the latter yesterday
& start at a marsh Wren.

Salt grass on the flats east
is entirely down. Hordening
jubatum is in seed and the
heads are blowing about
every where.

Willow shoots have made
a great growth. I had them
trimmed out of my little
grove and the place looks much
cleaner and neater now.

July 27 Thursday.

Clear and warm this forenoon. About noon a rain came up from the south accompanied by heavy wind. Three storms occurred during the afternoon with enough rain to wet the flats. The wind once became so strong that I thought that my south windows might blow in.

Bosley went to Corinne for water and supplies and did not return until evening.

Cook put in a new hollow wire lighting system for me in the evening. A small tank was put up in the storeroom holding gasoline under pressure from this a hollow wire (about 12 or 10 gauge) ran through the wall at the ceiling to a gasoline lamp suspended from the ceiling over the table. This gave a mild diffused light much better than the old one. Worked at the laboratory in notes and preparations all day. Put the microtome razor in order.

Also made some new shelving and rearranged apparatus and chemicals.

to better advantage.

When ever a heavy storm
comes up I lose several birds
in my pens. Today a
fierce wind and four young ducks
died.

July 28, Friday.

This morning the sky was overcast. The air was cool and twice a dash of rain came.

I ran up in the Gannet as far as Hansens and then came back down watching for Magpies. There were several broods along and I secured four. These birds are rare in the lower reaches of the river.

After this I ran down Brown's overflow expecting to get some ducks but found practically none. They seem to collect in ponds in infrequent overflows but leave when they are disturbed.

Phragmites phragmites spreads by long runners that sprout sometimes for 12 or 15 feet with roots starting from each joint. Worked a laboratory all the afternoon.

July 29, Saturday.
Cool and pleasant all day
today. In the morning I
went out Channel 2 in the
launch. The water has receded
greatly here and the left hand
branch barely gives access to the
bay. The water across into
East Pass was two or three
inches deep and was heavily grown
with short Potamogeton. Rowing and
knee pushing we worked half
way across to the first island
with each stroke while knee pushing
the boat travelled only during
the actual impulse and then
stopped dead still. Finally I
decided to walk and leaving
the boat proceeded on foot. Went
on about 2/3 of the way through
East Pass. The head of East Pass
is almost dry.

Near the mouth of pass I found
one sick mallard, two that were
found in the first island and
another sick one in the second
island beyond. Near the first
island was a young young
coot nearly dead and a coot 2/3
grown lay just beyond. One
mallard was eaten by maggots, the
other had died yesterday. This
might indicate some one spot
here where all these birds

had been made sick. ~~Earlier~~ the
whole bay was filled with
feeding Goshawk, About, 8 Kitt, Downy
Wilson Phalarope, Olive and Ducks
more of which seemed affected
in the coast.

We caught 9 or 10 young
Redheads in the mouth of #2.

I saw one male Cinnamon
Teal today still in breeding plumage.
It was with a female. It
might be that completion of
physiological acts of reproduction
induce the moult of molt
in the male. I have seen male
Spoonbill and Blue-winged Teal
~~and~~ in eclipse still with
females but barely. The Ruddy
has no eclipse & remains with
the female during rearing the
young at least for a week or
two. Geese remain with their
matters. Desertion of the female
by the male ~~may~~ in other
Anatidae may come through
the necessity for entering eclipse
plumage.

I reached home with the
young Coot just in time to
see a blood smear as the
bird died. I was certain that
the heart continued to beat after
the heart stopped which would

indicate death due to paralysis
of nerve centers controlling costal
muscles. This is in line with
what I have believed.

But in the afternoon in
studying making and labelling
blood smears from sick birds.
I am having some trouble in
securing suitable blood drops
for making smears. Nervulation
from a small vein in the
forearm so far but at times
this leads to undue cutting.

The bottom has rotted out
in the 6x12 jar and this
afternoon Bosley put in new
wires secured in Corinne.

The other pens were filled in
and covered with fresh rushes
also.

Tonight I found that the
^{new light} ~~new~~ is excellent for
use of the compound microscope
at night. Read and worked
until ten tonight.

Insects are bad at the
lights. The various species of
Pimplidinae give a pungent
rather disagreeable odor ~~when~~
when gathered in large numbers.
Caught two beautiful moths
tonight.

July 30 Sunday.

This morning we put the third large box in the river. New wire traps were stretched on the bottom. Just as we were ready to put it in I found that the wire on the front was rotting and now wire had to be put across it. This gun was made in August 1914, this being its third season. Racks of lath now surround all of the guns to keep out the carp. grass & marshes were strewn on the bottoms to cover the wire today.

I worked and read and wrote all the afternoon and then worked with the microscope examining blood smears etc until 9:30.

Very warm today. In the afternoon I wrote outside in the shade of the laboratory. I have not been able to do this before this season because of mosquitoes. Today they did not bother me at all.

July 31 Monday.

Water gauge 2 ft 3 1/2 inches.
The current in the river is
weak now so that boats are
easily blown out in the stream
by the wind.

I sent Bosley out No. 4. This
morning. He reported mud lake
dry across to Swiford's point
with two or three inches of
water extending along the rushes
as far as mallard point. There
were many flocks in the rushes
but no sick ducks. One young
coot found dead. Nothing else
of importance.

I worked on monthly accounts
until noon. Wrote until 3 in
the afternoon. Made dissections on
a Canada Goose for an hour and
then finished with correspondence.
Very hot with little breeze
today.

Expenditures July 1 to 3, 1916.

Amount available first of month	250.00
Total expenditures	<u>238.18</u>
unexpended balance	11.82
Estimated expenditures for August	250.00

Items of expenditures

July expense vouchers	172.83
Bosley salary	50.00
Schramm Johnson Farm 5	4.90
Shaw lumber Co	<u>10.45</u>
	238.18

August 1, Tuesday.

Was up this morning at six. Made six rounds of the duck pens then shaved and had breakfast. Left for Corinne at 7:45 in the train.

Left Booley to mop out the laboratory in good shape, to work as needed around the duck pens and to build the frame for a new pen.

The day was hot with an overcast sky in the forenoon and one or two slight dashes of rain. It was clear and exceedingly hot in the afternoon.

The river is low. At Corinne it has dropped $4\frac{1}{2}$ to five feet since May. The water was so low all along that the banks of the stream hid the view of the flats on either side so that there was no view of them.

There were a good many ducks in the river and in any young coots. In one place just below Corinne is a stand of Salix virginica growing thick and dense more than twenty feet tall.

In Corinne I got a hairnet and purchased, gasoline, gravel for the ducks, bean, corn meal and chopped meat. After dinner

at the hotel straightened out my
bill at the lumberyard with some
trouble and then certified to
my accounts before the postmaster
and sent them in.

Talked with Mr. Adams for a
few minutes.

Had supplies loaded to the
wharf and loaded up. Left
Corinne at 4:10. Stopped for
a few minutes at Hansen's and
purchased two hens for use
in experimental work.

Reached Duckville about
seven.

Cook purchased a gallon
of floor oil in Brigham for me.

Sterna forsteri

On July 22, As we were chasing a young duck in South Bay I noticed a forster tern that attempted to fly from its perch on a bit of drift but was unable to support itself on its wings. Rowing over the bird fell out in the water and was captured without trouble. Saw for a frequent white diarrhoeal discharge (with frothy feces) the bird was normal save in its inability to fly. It screamed Kah Kah harshly and bit savagely but soon with wings tied it was placed in the gut rushes in the end of the boat. Here it refused to have its head covered ~~but~~ and watched our movements with sharp eye screaming and threatening ~~without~~ with open bill whenever we came near. On reaching the laboratory that evening the tern was released on the floor and little attention was paid to it after it had been examined carefully and had been given some water. Next morning I placed a small wash basin on the floor with water and put in it a dozen or fifteen minnows one to one and one half inches long. The tern soon discovered the water

and grabbed the mirror quickly.
All told it ate more than one
hundred during the day. The
bird became ridiculously tame almost
at once and followed me about
with bill point up always looking
for fish. I had to be careful to use
care in walking to avoid stepping
on the bird accidentally so
closely did it follow.

For a few days it tried
to flutter out against the screen
door and then recognising it
as a barrier was content to
stand and look out. Myself
or my assistant caused no
concern but strangers especially
children were greeted with
harsh notes. The dog and two
pigs running at large also
called forth screams of protest
but the bird seemed unafraid
as it did not move from
its position before the door.
Much of the time it was
perched upon the broad
border of the wash basin that
formed its miniature lake. At
first it had difficulty in
perching as its legs seemed
weak and it was continually
falling astride the rim & extricating
itself with some difficulty.

Twice or sometimes ^{three times} a day I gave it small minnows in quantities and thus it was eager for. It seemed to recognize that for a small insect-like food and would run up and watch expectantly. Standing on the edge of its wash basin it seized the fish with sweeping aim, and swallowed them rapidly, nearly always head first. When becoming more excited it would hop in and with quick claps of its bill clear out the contents of the basin. Always it fed with wings spread and waving above the back. Fish were seized in the open fall from $\frac{1}{4}$ to $\frac{1}{3}$ of the length above the tip. Because of this the bird had trouble in picking up fish that fell to the floor, ^{usually} ~~usually~~ half a dozen quick strokes being made before the morsel was secured. Often it brought in fish in the wire screen but in which it captured them and the tern would in and peck peck at them catching its bill tip on the wire but always managing to get all finally. Any morsel that hung to its bill was shaken off immediately by quick turns of the head.

Often I teased the bird by
bringing in quantities of food
in a glass beaker. Putting the
beaker I allowed it to capture
one or two. ~~When~~ ^{When} the
beaker was placed upright the
bird would strike at the
glass intently in endeavor to
seize the food displayed
so charily. The bird would
take food from fingers or a
pair of forceps without fear.
The bird seemed entirely
without fear though like other
birds, it objected to handling.
When I found it necessary
to pick it it struggled but
showed no fear. When being
released. When I pointed my
finger at it it would walk
it an instant and then strike
it with its bill.

August 2, Wednesday
clear and hot today with
very little breeze. I was up a
little after six looked over the
duck pens and then cleared out
the laboratory and put on a
coat of floor oil. This dried
rapidly staining the wood work.
I was able to put on the
second coat before noon but
allowed the floor to dry until
after supper before putting things
in order. This oil will
facilitate cleaning up in here.
The live birds that I have
make quite a mess with
excrement etc and for sanitary
reasons it was necessary to
do something with the floor.
I found that I had just enough
oil left from the Tegalton to
cover the floor in the storeroom
also.

After breakfast I mixed up
a new feed for the young ducks.
I made it from $\frac{2}{3}$ bran and $\frac{1}{3}$
cornmeal added about $\frac{2}{3}$ of a
pound of finely ground chick
meat. This I mixed thoroughly
separating the particles of meat and
adding a very little water finally
I put in about $\frac{1}{5}$ the bulk of
 grit. Under ordinary circumstances

This would be too much, but
the birds have been without
grit for a time. The young
ducks and coots ate this
mixture eagerly but the adult
birds would not touch the bran
though they ate the meat.

We put the wire on the
framework for two experiment pens
next. This is a two man job
as one is needed to stretch the
wire while the other nails it.
We also spotted several more
pens and arranged all the
available platforms.

Bosley made a new drawer
for the table and painted the
tight box for experiments with
glass.

I put the paint in the
top of the laboratory when I began
painting this spring and went
up after it today. Found it so
hot up there that I could barely
stand it. Paraffin that I had
used to seal the can was
soft and running from the heat.
I turned out one of the chickens
that I have been using in
experiments and it hid out in
the willows refusing to come out.
Oswald came back for a
few minutes this morning. He

lit in a willow across the river and though I called to him refused to come over. He seemed very wild. Ray says that he came by yesterday also.

In the evening I trimmed up the willows taking off small shoots starting along the trunks in order to induce growth in the tops. These new shoots grow with great rapidity. In time I should have a fair grove here.

I was interested in watching the movements of two butterflies today. Both were perching on willow trunks in the shade resting. Blue bottle flies seemed attracted to them by some scent as a dozen flies were around each and were continually creeping up or lighting near the butterflies. Especially toward the distal end of the abdomen. Each time the butterfly opened and ^{was} shut the wings quickly frightening the flies away. I got within six inches of one butterfly but could detect no *Francisca* odor. One butterfly was *Vanessa anthopa*, the other a black species of the same size or a trifle smaller.

with a broad white band
across the inside of wings
& the outside with white
markings & red black brown eyes.

August 3 Thursday

Warm today but with a
south breeze that tempers the
heat.

Went down in Shrub Bay
taking lunch and did not
return until 3:30 P. M. A slight
breeze through the willows
at the laboratory seems
half a gale over the open
bay. Across the open water
the wind gets quite a sweep
and rolls up small waves.
These wash up strands

I ~~scraped~~ Potamogeton from the
bottom of the channels and
found the propeller of the boat.
Rowing is hard against the
wind too as the flat-bottomed
boats drift badly and it is
difficult to keep them headed
in the direction desired.
Though normally the water
around Slaughter Island is
low the south wind had
blown in water until it had
raised two inches at least.

Because of low water the
salt is raising in the ground
water in the lower bay. I found
the Scirpus nearly all dead and
brown on Slaughter Island ~~the~~
with only small parts of sickly

green in it. The scirpus growth
at the end of the old river
channel was affected, too and
was brown as in fall.

Around Slaughter Island the
water tasted fresh as usual.
A footprint in the mud filled
up by percolation with salt
water. I dug a hole in the
mud on the South shore of
the island ~~and~~ ^{six} inches deep.
It filled with strong saline
water at once. I dipped out
a gallon and it contained as
salt as before. Two other holes
a few feet away refused to
fill because of the character
of mud in them (inferior to
water).

The large bayou on the
main island northwest of
Slaughter was strongly salt
though the water outside
was fresh.

Around Slaughter Island
there were almost none of the
Corixids and Chironomid larvae
~~formerly~~ so abundant there ten
days ago. Instead the
mud of the islands was
crowded with *Ephydra gracilis*
that rose in buzzing swarms
at my approach.

There were practically no
corixids in the large lagoon
either. A hole eleven inches
deep at the shore of the lagoon
yielded a very strong brine.
In connection with this
I was struck with differences
in the bird life. Great flocks
of godwit, Dowitcher and
Western Sandpiper are now up
at the mouth of 3 1/2. Avocets
(are abundant) around Slaughter
Island and in the lagoon
and with are many Western
Sandpipers and great flocks of
Wilson's and Northern Phalaropes.
These were to be expected. There
were surprisingly few ducks in
this region. Occasionally a
few Redheads swimming by small
flocks of Pintails passed coming
in from lands East and they
were a few Cinnamon Teal about
but that was all. There are
not more than one fourth of the
usual number of ducks visible
in the bay. Last year in August
I reported great flocks of
ducks in the bays. Practically
no birds now were flying
off to the southward.
I found a sick Black Turn
in Slaughter Island. And picked

up a sick Avocet in the lagoon. Bosley picked up a sick Redhead (young) and a Cinnamon Teal that were in the last stages. These two died in the boat. Sackett gave me an ibis with Duck ~~also~~ sickness.

I saw a dead Forsters Tern along $3\frac{1}{2}$. Caught two young Redheads and brought them in.

Returned to the laboratory about three-thirty. Made critical notes on my live birds and made a blood smear from the ibis. Had Bosley arrange a new experimental pen for the control ducks. The new pen in the old one has caked and is hard on their feet.

Clyde Webb came about six with some visitors and I showed them the place.

Collected 8 Avocets for streaks today.

Received a box containing three gallons of alcohol from Washington this evening.

August 4, Friday

Today has been very warm though a steady breeze has stirred the willows. About four P.M. I sat out in front of the laboratory writing and the wind blowing across the bare alkali flats baking in the sun struck me like the breath of some great furnace. The laboratory itself was very warm.

Toward evening a storm brewed in the south coming finally the promontory range in a dark solid cloud from which came flashes of lightning. Slowly the storm spread until by nine it was above me. With it came a gale of wind a mere whisper of air at first that increased at once to half a gale rattling the windows, shaking the building as though it would overturn it. A light dash of rain accompanied. All day the flats and shallows on the lake front have laid steaming in this blazing sun and with this storm from the south came the breath of the lake an odor ~~that~~ filled the a redolent of great sewers, of horrible, crawling

noisome carcasses rotting in
filth, of things unspeakable
in their stench and loathsomeness.
One might imagine ~~that~~ it
the breath of some terrible modern
old world battlefield with its
dead creatures putrid under
a blazing sun. This smell
came stronger and stronger
until it was almost overpowering.
Now have I found it so strong
here.

At nine thirty going out I
saw a peculiar thing. The storm
bodies had cleared the Promontory
Mountains leaving a band of
clear sky above them in
which hung a sinking moon
about one-third full. The
sky above was black and
a slow rain was falling
driven in gusts by the power
of the wind. The air was
lighted by an unearthly grayish
light that set off the willows
buildings and the river in
a ghostly fashion as though
daylight was at hand. As
the east was indicated a
rainbow the second made
by reflection of the moon that
I have ever seen. It stretched
across the sky as a complete

arch faintly indicated as
a pale band ~~with~~ lighter
than the sky. No color was
indicated. It was almost
illusory in its appearance
and gazed at for long
almost disappeared as if the
retina tired in bringing it
out. In about ten minutes
it was fading rapidly and
soon disappeared.

August 5, Saturday.

The sky this morning was overcast and it was cool.

After a few odd jobs about the laboratory took launch, rowboat and seine and went up the river and out Kundersen ± 1 . Left the launch stuck in the shallow place and went on down toward the mouth. We placed the net in a loop across the head of the small channel and then drove up toward it. Saw cinnamon teal and two green wings went into the net and I drew the net end across closing the loop. No more could be captured here. Ducks seemed few.

Out on North Bay I could see a good many but still they were not present in their usual abundance.

After dinner I made one or two blood smears and attended to some birds about the laboratory and then with Cook and Bosky went out No. 3. We set the net across the channel in a loop and then Cook and Bosky went down to drive the birds while I lay in the willows.

watching. Among the first of
the ducks to come up was a
male Bluebill and this bird
~~promptly~~ fought the net in an
endeavour to get through for
ten minutes in one place. A
number of flapper Cinnamon teal
came up headed by an old
mallard and these found a
way around. The only ducks
that we captured were seven
Redheads and the Bluebill. More
came up but due to mauling
the net and the misguiding
activities of a cursed yellow dog
they escaped.

Many carp came into
the net and as Eoot was
trying to get some carp to send
up to the fish hatchery for
bait food we tried making
a haul for them. Meanwhile
~~a~~ heavy clouds were banking up
in the south and a hard
storm was brewing. Suddenly
great flocks of Avocet came
screaming and calling up
from the ~~south~~ lower bay and
within five minutes the
storm burst. First came a
great gust of wind and
then a deluge of rain
that seemed completely to fill

the air. A small amount of
hail came at first but soon ceased.
I was dressed ~~in~~ thin
sleeveless underclothing only
and the beat of the rain driven
by the wind stung my bare
arms and shoulders until the
skin smarted. We sat in the
water with only our heads
out for twenty minutes or more
until the storm abated. Then
with chattering teeth loaded the
seine, and after two or three trivial
mishaps started back up the
overflow. A little rubber umbrella
on the spark plug of the motor
saved engine trouble as it had
kept the ~~up~~ porcelain of the
plug dry & preventing arcing to
the cylinder head.

Reaching the laboratory I attended
first to the ducks that lay tied
flat and wings under the covered
front of the launch. Then after a
brisk rubdown with a heavy
towel and a snifter of scotch
I was ready for dry clothing.

A window was open at the
laboratory but no damage was done.

The pen containing my
control ducks had blown off the
platform and turned bottom side up.
By some chance two of the
three ducks in it had remained

They had plucked one poor young Cinnamon Teal until its rump was bare and entirely and red and irritated from the nibbling of its companions. I placed it in pen #56 with some sick birds and removed several of the larger immature birds from No. 15 placing them with the Mallards in number 1. Here they will have to behave as they are in larger company.

The Gadwalls are worst in this respect. The young drakes seem to start the trouble and when once a duck is attacked all the larger ones pick at it until it is in a pitiable condition. Not content with pulling out the feathers and eating them the ducks work until they break the skin and then eat out the fat around and about the oil gland. Of Drakes among the ^{young} Anatinae (at least among Gadwall and Mallards) may be known by ~~their~~ the manner in which they nod or bow as the drakes do in breeding season. Gadwalls seem to do well in captivity but are rather a bird of no character. At least they do not appeal

to me. They seem weak and
rather listless. The young
when ten days or a week
old may be reared readily.

This evening I prepared
a mash of bran and
cornmeal for the ducks again.
This time for meat I used
a pound or 20 of fresh
chubs. The fish were caught
killed and ground up in
a meat grinder and fed at
once. This made an excellent
feed and is better apparently
than buf. Even the Brown
ducks ate this mash in
preference to grain which the
Buf mash they seemed to
care little for. In bulk it
requires more fish than buf
to mix this feed as the
fish contain more water.
I shall purchase a meat grinder
for office use as it will
save its price in a short
time besides saving the
worry and trouble of securing
ground meat in Cornish. There is
danger too of meat spoiling
and causing ptomaines when
it is kept on ice. With a
grinder I can give a
supply of fresh meat as needed.

August 7, Monday.

Cool and pleasant all day today. This morning I began these new experiments. Sackett came up about eight with 11 young ducks and 3 sick ones I should purchased at twenty-five cents each. \$3.50 for the lot. This is considerably cheaper than I can catch them myself. The sick birds I was glad to get. He secured them around Second Mallard Point in North Bay. Among the young ducks were five Rustys. These I will try to rear. (Propagation of Wild Birds) Had no luck with his but apparently was trying to keep them on dry land, a procedure that would seem to promise little in birds that can barely stand on land. As always they were mischievous little rascals that nipped my fingers at every opportunity. I was in the pen with the other young ducks they dove at me and during the day when I happened to look in it would be a minute or so before I could catch sight of me. They kept out along the outer screens

and were under water constantly.
I made blood smears from
the sick birds today staining
with Giemsa's Azur-eosin.
This gave beautiful slides but
as yet I am unable to
make out any pathogenic
organism. Leucocytes and
what I take to be blood platelets
show up in abundance. Without
counting the leucocytes seem
rather abundant. I have a
Haemocytometer but the ruled
lines have worn away until it
will not serve for blood
counts. In making smears
I take the blood from the
wing about 3/4 of the distance
from the distal end of the ulna.
I worked most of the
day on these slides examining
them. The stain seemed to work
very well though I have
never used it before.

Boshy charred out the
boats and prepared two
more experiment pens. Ducks
were placed in these this
evening.

The brown stain of algae(?)
that I noted last year is
appearing along the river edge
again. I made a mount of

Some it this evening staining
with Methylene Blue. The
~~staining~~ that el Beterin gives
the color is a slender
spindle shaped organism. In
most cases the attenuate
end of the spindle is bent
at the tip to the left. i.e.

Other organisms are present.
A heavy storm up the
valley tonight with a strong
electrical display

A chicken a month old
brought over from the house seems
to have ~~poison~~ remain poison. legs
are weak & will barely support
bird. ~~legs~~ can walk but are
spread out at an angle
or "splayed". Bird cat lying
on breast. Gave $\frac{1}{2}$ teaspoonful
of castor oil.

August 8, Tuesday.

Cool and clear this morning. There is a feel of fall in the air again.

Before breakfast I made the rounds of the duck pens and saw to it that every thing was in good shape. Now I have three large six by twelve pens in the river. One has large ducks, one young birds and Ial and one reserved for sick birds. Then there are ten experiment pens on platforms all containing birds. I keep my pen at present near the large pens to put birds in temporarily and another smaller one at the laboratory for the same purpose.

After breakfast we went down the old river channel. Ran down in the launch to the mouth of the Ruler Canal. I had thought that it would be too shallow but I touched in one place only. Rowed down the old river channel to the canal into North Bay. The water was deep and the Potomac went so that we got along without trouble. I can see the effect of pasturing cattle here on the vegetation. The salt grass is shorter and some rush growth has been eaten.

down. I do not consider it
of great account however. The
Ducks are driven a mile or
so farther down.

There was a great flock
of ducks in the old canal
and many in North Bay. All
in all however I do not consider
ducks more than one third as
abundant as at this time last
year. Of this is an index of
the number of birds for this
western country it seems serious.
~~Spent~~ Birds may come in here
in abundance later. Should this
be a marked decrease this
season however sportsman cannot
attribute it to the Duck sickness
as practically none have died
for two years. 1914 when many
died was a good season for
hunting. Any decrease now can
be attributed only to over shooting.
I found five dead Pintails
(all males) one young Redhead,
one young mallard, one crow and
four or five immature Coots all
swimming a short distance of the
mouth of the old canal into
the North Bay. One immature
Coot was picked up in a helpless
condition. I worked along as
far as Long Point but found
nothing else. One male Pintail

got away in the rushes. It
may possibly have been a flapper.
I found a good many sick
birds here late in the season in
1914.

The entire bay was filled
with birds here. Western Sandpipers,
Godwit, Dowitcher, Wilson Phalarope
were here in abundance. Also
Snowy Heron, Night Heron, Yellowlegs,
Black Doves and others were
common. A flock of 1000 green-
winged Teal was straggling off
shore. Yet of these I did not
find one sick bird. This
would indicate that the
trouble here was present somewhere
in shallow pools in the rushes
which these birds were not
frequenting. There were considerably
areas of semi open water one or
two inches deep that was
standing warm and stagnant. I
brought two pails of this back
to the laboratory and started
an experiment with it to test it
on captive birds.

In the waters of the
bay were great numbers of a
jelly like infusoriate. Small ones
one to three millimeters in diameter
clung in clusters on the stems
of Potamogeton. Larger one 1/4 to an
inch in diameter, some of them

Nearly an inch long floated on
the surface. Great quantities
of these had been cast up on
shore. I fed five to a young
Redhead to test their effect
(Experiment 77)

Snails (*Limnea palustris*) were
abundant and I gathered a
quantity for the ducks.

~~Returned to the laboratory at~~
I walked down as far as
Long Point. The mud was soft
on top but firm below so that
going was not hard. The bay
behind Long Point was entirely
dry. Water in the North Bay
here was very shallow.

Returned to the laboratory at
noon and worked there until
dark. Made blood smears from
the sick coot and from a
healthy immation still using
Giemsa's azur-eosin for stain.

Fed one Redhead the
mucus & contents of stomach and
gizzard from a sick pintail
piled up dead this morning.
To another I fed the eyes and
lacrimal and Harderian glands.
These experiments hardly signify
anything as Ravens constantly
eat the sick birds and I
have yet to see a sick raven.

Gulls do the same and of
course then sick gulls but
there is no reason to suppose
that the gulls are not made
sick in the same manner as
the ducks.

This afternoon we had
then thunderstorms that wet
the flats but did not bring
a great amount of rain.

In the evening there were some
beautiful clouds effects and
the mountains stood out a
deep purple. There seemed to be
heavy rain up the valley.

I fed a mash again tonight
and even the brown mallards
seemed eager for it.

August 9. Wednesday.

Water gauge 2 ft 3 $\frac{1}{2}$ inches. Temperature
7:00 a. m. 58°. The river has
come up slightly today. The air
today was cool and pleasant
a certain promise of fall.

Mosquitoes were rather bad
last night after the rain but
do not bother now under ordinary
circumstances.

Worked all the forenoon on
Notes and caring for the
birds that I have about.
Three young Ring-billed Ducks secured
from Schmitt - Monday were dead
this morning.

August 10, Thursday.

Today was fairly cool and pleasant all day. I worked at the laboratory all the forenoon. After dinner I went down to the mouth of No. 2 in the launch with J Bosley and James Hull Junior.

The water has gone down still farther here and but little was running out the left hand branch. To the west the Bay was nearly dry across to Mud Point and there was very little water in East Pass. A considerable number of Pintails and Greenwinged Teal were feeding in here. These birds I believe have just come in to the marsh.

A number of newly dead birds were scattered about. I worked the country at the mouth of Channel 2 and across nearly to the head of East Pass and saw the following dead.

Coot	13
Lesser Yellowlegs	5
Forster's Tern	2
Mallard	1
Redhead	3
& lots	1

Avocet

1

Green-winged Teal

1

Common Teal

1

There were several sick

birds captured viz.

Pintail

5

Mallard

2

Green-winged Teal

2

Notes and these follow.

Worked at the Laboratory

until nine thirty this evening.

August 11, Friday

Today I worked at the laboratory all day. Art Boothe and Son and Son Johnson were here for a while. Boothe has rented Sackett's game club for the fall and will run it in connection with Johnson.

The Redhads in the stock pens have killed five young cinnamon teal. Yesterday they did up a female spoonbill. I have decided to build a new ~~set~~ six by twelve pen for them and put them all in by themselves and keep the other ducks separate.

Today I put most of them in with the Mallards and Pintails but part escaped and had to be recaptured. I had trouble with them all last year.

Bosley went to work at once on the frame for the pen. Jimmy Hull will bring out the wire from Bingham when he comes.
Cool & pleasant today.

August 12. Saturday.

Cool and pleasant all day today. After breakfast we went down No. 3 and tried to catch some more ducks. There were practically no young birds in the overflow and the few that did come up escaped us.

There were a considerable number of Green-winged Teal and Pintails in the overflow. I searched the banks of the overflow and secured one Blue-bird, Mallard and Bosley picked up two young ones.

In the afternoon I worked at the laboratory with birds and notes. Bosley cleaned the place up in good shape.

In the evening it was quite hot for an hour or two and then a tremendous wind from the south arose that shook the laboratory and caused some anxiety for the safety of the experiment jars.

Sick birds is due to the fact
that the new arrivals have
no resistance to the toxic element
in the water and they are
readily affected. While birds that
have been in for some time
are unaffected as they have ~~not~~
such a resistance. The birds
found today were along the
banks of the overflow and
are the first seen in that
locality this season. This points
to their coming from the flocks
that frequent these localities.

On the evening small
flocks of Seal kept passing west
of the Club house apparently
going into North Bay to feed.
At least two thousand Green-
wings crossed before dark.
It might be that the birds
are infected or poisoned while feeding
and that the effects come after
they return to the flats to rest
hence the sick birds in the overflow.

August 14 Monday

Smith not today without much wind. I worked at the laboratory during the forenoon. After dinner I went out Number 2. There were several sick ducks near the mouth of the overflow here and I found others about the first island in the head of East pass. Here the water has dropped leaving a considerable area of Potamogeton drying in the air. This seemed a plausible place for infection so I scooped up two pails full of water taking Potamogeton, grass and mud sand and took it home for ~~then~~ ^{an} experiment. A large number of Green-winged Teal were in here at the mouth of the overflow.

Jimmy Hull came down this evening and brought me wire for the new Railroad pen. We put part of it on the frame this evening. Bosley made a mistake and cut the frame of his pen $3\frac{1}{2}$ inches too short so that the wire had to lap over.

Hull captured an adult Pied-billed Grebe and I made a blood smear from it this evening.

August 15, ~~Monday~~ Tuesday
Cool and pleasant all day.
I worked at the laboratory all
day. In the morning we
finished the pen for the Redheads
and put it in the water. It
is made of inch mesh wire
throughout. Placing this pen
setting up the racks and
then shifting the ducks
occupied nearly all the forenoon.
All the Redheads are together
now in one pen, the pen is
reserved for Pintails, Mallards and
Gadwall and another for Seal
Eggs and spoonbills. The fourth
I use for sick birds. This prevents
their being crowded by the
stronger individuals. As fast
as the birds grow strong I place
them in the other pens.

The wild birds bidy over the
weak ones, or even stand on them
if they have an opportunity. Ducks
especially drakes seem to like
to stand on some little creature
and that this may happen to
be a live duck too helpless to
move seems to make no difference
to them.

Had visitors for a while
after ~~break~~ dinner and then
some sick birds were
brought in to me.

August 16, Tuesday.

A very high wind from the South all day rendering it impracticable to get out on the bay. The laboratory rocked and creaked all day long. Once I thought the windows would blow in.

Worked inside all day.

August 17 Thursday.

This day there was a violent wind from the south all day. After breakfast we went down 3/2 and I picked up a number of sick birds. It was difficult work to handle a boat in the wind. Most of these birds were quite stray. A few more birds have come in here but not many.

August 18, Friday.

This evening it was very cool with a temperature about 50°.

After breakfast we loaded three experiment ponds in the rowboat and took them down #1 wharf we placed them in stagnant water on a pintail reef. ~~that day~~ each pond we placed one bird. The ponds were sunk in the mud to allow the water to flow in from the 1X4 at the bottom. Placing them took most of noon.

After dinner I worked at the laboratory while Bosley went down to 2. No sick birds encountered.

Two occurred on #1 this morning. One it saw crawl out a short ~~and~~ a hundred yards away. I waited a minute before going to it to take a picture and in that space of time a Californian Gull had laid its back open. This bird was later killed by other teal which tore open the space eating all the meat from the vertebrae.

August 19, Saturday.

Very cool, almost cold in fact
this morning. We went out
3 1/2 in the morning and
directly down to Stoughton Island.
The salt water had come in here
and has cast a windrow of
Potamogeton seeds and rubbish
on the shore. There were several
pools of strongly saline water
on the island. I gathered
two pailfuls to use in experiment
work also a jar of Potamogeton
seeds.

There were half a dozen
dead Pintails on the island. Dead
birds disappear very rapidly
down here. Since the third of July
there have been six or eight dead
birds found here on each visit.
Predacious animals eat them and
they rot so that in one or two
weeks they disappear.

The following fresh dead were
noted.

Pintail 7

Green-winged Teal 1

Calif. Gull 1

Ring-billed Gull 1

The sick pintail was captured.

Crossing over to the
Main shore we got a number
more sick ducks. Most

of these were congregated in
One salt slough & the
water was a foot deep. Nearly
all were quite active.

About 25 dead pintails were
encountered during the day. A large
part of them were females.

We returned through the
inside Channel to Slaughter Point.
There were a large number of
flapper pintails, in here and many
more about Slaughter Point.
All told we secured the
following today.

Pintail	17
Spoonbill	2
Chimney Scaup	3
Green-winged Scaup	4
Coot	1
Calif gull im.	<u>1</u>
	28

Most of these birds were
only slightly affected.

For a week the wind has
blown hard from the South
but today it came from the north
all the water from Slaughter
Island was strongly saline.

Walked down to Number 1 to
visit experiment pens. &

Had to shift some ducks tonight
in the stock pens also. Have put all
sick birds in # 15.

August 20, Sunday.

This morning we banded and
released over thirty birds. All
were fairly strong.
Worked at the laboratory the rest
of the day.

August 21, Monday.

Up this morning at 6:30. The morning air was cool with the thermometer at 45° but the air was clear and the sun pleasantly warm. No breeze was blowing and the mountains lay in a distant haze. Bobolinks were flying and all in all it was a typical fall morning.

Mosquitoes appeared suddenly in some numbers two days ago and have been bad ever since. I had hoped that we were through with the pests for this year. They are very annoying about the experiment pens.

This morning after sending laundry and mail in town by Sackett I went down to the experiment pens on Channel 1 with Bosley. Because of a north wind the water was receded somewhat and two of the pens had been left dry. Small shittos were dug to lead water in to the pens from the shallows connecting with Birdtail Neck. This water is stagnant saline to the taste clear somewhat tinged with brown. The birds in the experiment pens seemed in the best of health. They were somewhat muddy but cleaned themselves up at once when

water came into the pens. Last season I confined two birds in a pen which had a great deal of trouble as they trampled each other in the mud. I believe that even in experiments at the laboratory that it is better to use single birds.

Returning I cleaned up a lot of odds and ends about the laboratory. Dermestes have begun to work in my chest so I packed all the skins ready to send in.

Booby filled in the stock pens where the birds had been digging and covered the dry portion with grass. Several of the Redbills and Pigeons were about the pens yesterday.

After dinner I worked until five steadily on notes. I have had too much company lately and have fallen behind. Am experimenting with normal salt solution at the laboratory now.

Booby went out Channel 2. He reported that there were few ducks resting there now and that East Pass was practically deserted too. This I attribute to low water here. A north wind for two days has driven the water down. Then too the moss

is going out which has
considerably effect in jamming
up the water. It is significant
that he found no sick birds
on #2 today. Previous to this
there have been great flocks resting
on and in the sick birds
have been found on each visit.
Apparently then the birds
come in in flocks and some
become weakened and unable
to leave. This would seem
to indicate a point of infection
occurring there about the
mouth of the overflow. But I
must attempt to find out if
there is much of an evening flight
to the south.

August 22, Tuesday.

This morning the thermometer stood at 48° and it was cool all day.

After breakfast I went out Brown's overflow in the launch. The water was high here and there was good drainage into the bay. Many ducks and large numbers of coots were out in the open where they enjoyed an abundance of good fresh water. There were no great banks of birds though as we found at times. I suspected the birds were all scattered. There were comparatively few about the mouth of the overflow. No sick birds were seen at all.

We noted a number of Happer's Cormorant, Seal, Pintails and Mallards along the overflow.

Returning I went out the Kennell Canal. There were a good many ducks at the mouth of this. One sick Pintail was brought in.

Out #1 in the evening to look at excrement pens. No sick birds were

August 23, Wednesday.

This morning we went out
in the launch to the mouth
of the Natick Canal and then
in the rowboat down the
Old River Bed and across into
North Bay.

Sackett and Keller have
cut a considerable area of
Sesuvias down here, *Scirpus*
Americanus, round *Scirpus* and
some *Puccinellia* and are putting
it up for hay. They have a
large stack and are putting
up another. This is for winter
feed for their cattle. This practice
if continued and enlarged
would encroach upon the marsh
to a considerable extent.

We worked through the rushes
from Mallard to King Point
leaving me sick greenwing
and an Avocet only. From
King Point there was practically
no ducks in sight to the west.
Many gulls were walking
about on the flats.

I saw a brood of Cinnamon
Teal a week old and young
Redheads are common. Certainly
it would be a mistake to open
the hunting season here before
October. Also captured a Mallard
that was unable to fly.

There are many Hopper Chicks
still in the bushes.

I took from the Garfield
Smelter filled the entire valley
this morning. To the south
it formed a line like that of
fog resting 200 yards or so
above the earth.

There were great numbers of
Green-winged Teal in the old River
Channel and many Pintails.
As we came they crossed into
South Bay.

August 24, ~~Friday~~ Thursday.

This morning it was quite cool again. After breakfast I went down to Pintail Neck to see what birds were lying in there and to look at the experiment pens. There were practically no ducks there or in East Pass and consequently no sign of sick ones. The birds in the experiment pens confined in water here were all healthy. All have grown.

About 10:30 Mr. Brigham Nelson of Perry came down with three sick chickens. He has lost a number lately and wanted to know what the trouble might be. After examining the birds I gave a diagnosis of "limber neck" due to ptomaine poisoning. Two of the birds were nearly dead. The third was stronger. So this one I gave castor oil with the result that by evening it had improved.

After dinner I went up the river and out the Kendall Canal. As nearly as I could estimate there were about 7000 ducks banked up here. Two thirds of these were Pintails. Next in abundance were Green-winged Teal. Mallards were common and

there were scattered Cinnamon Teal,
Spoonbills and a few Gadwall.
No sick birds were seen.

Nelson brought me four water
melons. So in the evening I
gave a "party". Jim Hull, jr. came
to with another so that we
had sufficient.

August 25, Friday.

Cool and pleasant today.
I worked at the laboratory all
day on notes and
correspondence.

Wheat is now \$1.28 a bushel
and barley 1.40 per hundred.
I am feeding 12 quarts twice
a day to the birds now so
that it takes considerably to keep
me going. Ran short tonight
and had to get a sack of
wheat from Sackett. This grain
really belongs to Cook so that
I will repay it for. Davis will
send you four sacks of grain
Monday.

Booley went down to Sackett
with the launch in the evening
after grain.

August 26, Saturday.

This morning not too late in during the day. Very little breeze blowing all day. There is a distinct wave of migration today. Yellow & Pileolated Warblers common in the willows, a Water Thrush along the river and a Rock Wren near the laboratory. In the afternoon an adult male Macgillivray's Warbler was seen.

Chaulea integrata, *Helminthus rustalis* are in full bloom. *Scidgo* is just coming in.

3 1/2 After breakfast I went out in the launch. The full quota of ducks is present here there and the marsh now. The whole of South Bay from Bird's Overflow west and as far down as I could see was covered with ducks. These were mainly Pintail and Green-winged Teal with many Mallards and a few Spoonbills.

The river has raised half an inch here but the water in the bay has dropped so that there is much of the banks of the overflows exposed. This drop is due probably to the clearing out of the Potomac in the bay. This cross serves to bank the water up in the

hold it back. The lake too is
low causing the flats to drain.
There were very few shore
birds here. No godwits were seen
at all.

Two sick green-winged Teal were
caught but no more sick birds
were seen here. Returning I
cut through in the cross channel
to #3 and went down to
Big's overflow. At the mouth of
this overflow large areas of mud
have been newly laid bare.
Here we caught 7 green-winged
Teal, 1 Spoonbill and one Pintail.
Gulls mainly California with
a few Ring-bills were very active
here. I saw them pursuing
sick birds that were only slightly
affected. The gulls alighted near
the Teal and attempted to seize
them. The Teal escaped by diving.
One Pintail that was helpless
had been eaten in the camp.

The mud was very soft
and deep through here and walking
correspondingly difficult. Two
sick birds escaped because of this.
I noticed that some of the
willows (*Salix amygdaloides*) growing
farthest down were dying.
On the afternoon I worked
Notes and specimens at the

laboratory. Mosquitoes have
decreased again. And I was
able to sit outside in the
shade without being bothered by
them. It was cool and
pleasant.

The chicken brought down
Thursday by Brigham Nelson
now seems entirely well and
spends its time hunting for
food. It has no fear of us
whatsoever.

The windows and frames
in the laboratory have never
been painted, and Bosley is
going over them now. The
putty around the glass has
come loose and in some cases
and needs replacing. This will
put the place in good condition
for the winter.
Cook went in to Corning
this afternoon and I sent in
for five gallons of gasoline.

I find that in putting weak birds that have been kept on dry land ~~and~~ into the stock pens that it is best to put them into the water in the morning. This gives them the entire day to become accustomed to the pen. The birds drink a great deal at first which tends to lower their temperature. When they lie helpless their feathers dry out and do not receive their usual preening. Once in the water the birds often become very wet and bedraggled especially if they receive a great deal. This renders them liable to chill and if the nights are cold they are more liable to succumb if placed in the water in the evening. It is bad too to put them in on cold rainy days.

I believe that the bottom of the stock pens should be covered with inch mesh wire in all cases. At present I have two inch mesh on the bottom of two pens and find that the birds dig their way out ~~badly~~. They are unable to work to any great extent through inch mesh.

It will be better too I think
to separate teal and spoonbills from
the large ducks when they
are brought in weak as well
as ^{well} later on when they are strong.
The Pintails feed Mallards fast
heavily about picking over the
smaller birds in a bad way.

Feeding in troughs has proven
a great success. No. 1 Redheads
the trough is made ten inches
wide for other ducks four inches
wide. The troughs are one and
 $\frac{1}{4}$ inches deep and five feet long.
These troughs are placed in
the pens cross wise at the
waters edge so that the
ducks have ready access to
food and water at the same
time. A separate receptacle
 10×14 inches and $1\frac{1}{4}$ inches
deep holds grit. One of these
is in each pen.

I have been feeding bran
mash containing ^{small} every other
evening but now will reduce this
to twice a week as the other
seems too frequent. The ducks
seem to prefer barley and wheat
mixed to straight wheat. The
Redheads of course clean up
everything without discrimination.

In the laboratory I keep weak
birds in wooden trays 20x24
inches inside. And 3 1/4 inches deep.
The bottom is of tongue and groove
flooring. These trays are painted
to facilitate cleaning and are
a great convenience. I place
heavy paper in the bottom and
put the birds in. The paper is
renewed each morning. I
keep birds here that are too
weak to hold up their heads.
As they grow stronger I place a
pan of water in front of them
and when their eyes open
they usually drink freely from
this. If the birds are fat
and healthy they get along without
food for two days. Then I feed
them just things 1 to 2 inches long
morning and evening. Birds that
are thin in body are fed
all along. Grain may be fed but
it is a troublesome process.
In feeding I seize the head
in my left hand open the
bill and hold it open with
thumb & fingers. The fish are
pushed in back of the tongue
by means of a pair of tweezers.
I give from 6 to 12 at a time.
With all sick birds that
are at all weak. I find that
castor oil is an effective means

of cleaning them out. The is
Administered by means of a
medicine dropper. Each receives
half a teaspoonful, large ducks a
teaspoonful. This passes out
in twenty to thirty minutes.
and seems to serve in cleaning
out the intestine as well as
soothing any irritation present.

In some cases the excrement
is almost entirely renal. This
seems especially true when birds
are exceedingly fat and get no
food save water. The renal
matter is tinged pale green and
comes out in balls that dry
and harden almost at once. This
renal matter is very irritating
to the protruded anus and keeps
it reddened. One green winged
teal male had its penis caught
in one of these extruded balls of
renal matter to that it pulled entirely
out of the cloaca. I freed the
organ and found it much
irritated.

When the birds begin to drink
themselves the water passes through
them rapidly and their
recovery is very rapid. The water
in quantities seems very good for them.

August 27. Sunday.

Clear and cool this morning
very little breeze. quite hot during
middle of day.

Yesterday there were many small
birds in the willows but today
there was practically no
movement of migration.

After breakfast I banded
and released about 32 ducks.
Nearly on half of these were
sick ducks brought in August 19.

For these a well was needed
for their recovery. Others take ten
days. After it happens that
a bird thrown seems weak
and unable to fly but these
all recuperate their strength in
a day or two. While I kept
in the pen they fail to get
stronger. After birds that are
strong and vigorous when
thrown up merely set their
wings and scale down into
the river. Few that are just
out seem at all alarmed.
If other birds are on the
river they decoy to them at
once.

August 28 Monday

This morning Cook took me in to Corinne in his car and I left at ten on the alkali wagon for Kelton. The day was rather hot and all windows were open. At Blue Creek a number of mosquitoes came aboard much to the discomfort of some of the passengers. As for myself I am case hardened so that they did not bother me. Crossing the Promontory Range I had a fine view of the marsh and Delta of Bear River. Passing Little Mountain I had a view of two caves that I have often wished to visit. One was under a white rock near on the eastern end the other near Cedar Butte.

Gnashoppers swarmed in many of the dry fields along the track furnishing any abundant food supply but I saw no birds among them.

A warm spring near the south side of Little Mountain has been fitted up with a rough bath house.

West of ~~near~~ Little Mountain was a series of steep sided washes eroded by water action. Some contained dirty brownish stained water. Others were dry with the bottom glittering with a heavy

alkaline encrustation or efflorescence.
South of the tracks was a level
alkaline plain studded with
round ~~and~~ oval ^{or irregular} islands grown
with greasewoods.

May Blue Creek two large
Box elder trees grow near the water
tank. These must be quite old.

At hampden below the grade
across the Promontory Range were a
few more box elders.

As the train climbed over
the pass sagebrush replaced the
greasewoods and great areas
were yellow with Helianthus
blossoms. Little Promontory seen
from here shows as an
isolated hill separated from the
Promontory Range by a deep valley.

Promontory lay in a small
depression in the hills. ~~It~~ ^{It} ~~old~~
was made up of a store owned
by F. C. Houghlin and one
other house.

Arrived at Kitter at last for
a wonder.

Very hot here this afternoon.
Spent the entire afternoon with
my notebook as I was
behind.

Arranged for a team to go to
Locomotive Springs tomorrow with
some trouble.

August 29, Tuesday.

Left Ketter for Locomotive Springs this morning at seven. The morning was cool and though cold in the day it became very warm.

The road followed east along the railroad track for 6 or 8 miles through a flat ground with greasewood. Twenty years ago in October when I traversed this same country Jack rabbits were everywhere. Today I did not see one. Some sickness is reported to have cleaned them out last winter.

There were a few shrikes along an occasional Eutamias and a few Sage sparrows. I shot three Eutamias in the afternoon. They were shy but responded to a squeak.

Crossing the track the road led quartering across the flats toward Locomotive Springs.

There are six of the springs that are first and last distributed through five or six miles. From west to east these are known as the West, Baker, Bar M, Middle, Cliff and Sparks sloughs. These all rise from 4 to 5 miles from the present shoreline of the lake and flow down through channels to form in a marshy area near the lake.

The surface of the springs is

probably 6 to 7 feet above lake level.
The springs lie on a low bench.
They rise directly from the flats
with nothing to indicate their
presence until one is upon
them. The Baker & Bar M sloughs
were each from 50 to 75 feet across.
The west slough about 30. I did
not see the others. These springs
must be formed by ground water
running down through the porous
soil until it encounters the
impermeable clays of the lake
bluffs.

I drove down between the
Baker and the Bar M sloughs
unhitched and began work at
once. Mosquitoes were extremely bad
here while the attacks of green
legged drove the horses frantic.

I crossed over to the Bar M
slough first. The channel of
this slough ran from two to
four feet deep while it varied
from six to 12 feet in width.
The channels are treacherous and
many cattle are drowned in them.
It is a common saying among
the cowboys here that enough
cattle have been drowned in the
springs to build a fence of
gold around all the channels.
Bordering the alkaline barrens
that was destitute of vegetation

were abundant growths of Salicornia
utahensis a large woody species
readily distinguished from the
smaller S. rubra. Great areas were
covered with salt grass Distichlis
spicata and it was in these
~~that~~ the mosquitoes were so bad.
Growth of Salicornia rubra were
common and I saw much
Issa sparsifolia. Donelia erecta was
also common.

Tules bordered the channels
and towered down formed great
marsh areas. The great mass of
these I found somewhat to my
surprise to be Scirpus olneyi.
In some of the more saline areas
were small clumps of S. americanus
~~Chenopodium~~ ^{Atriplex, Nasturtia} altissimum was common
as was a plantain (spec. Triglochin maritima).
The channel was grown entirely
with Potamogeton pectinatus forming
great masses. A green algae was
abundant also. In shallow ponds
I found an abundance of Chara.
Najas nuttalli and Lactuca
pulchella formed scattered growths.
Salt grass, Scirpus and
Potamogeton are the dominant types
in their respective associations.
As the marsh approached the
lake shore & saline concentrated in
the soil vegetation thinned & became
limited and finally disappeared.

The actual shoreline seemed
built up slightly for a long
distance. Great Areas were covered
with piles of timbers and other
refuse from the cut-off. ~~But~~
Sitting here in the open
free from mosquitoes for a few
moments I had leisure to
look back at the mountains.

The hog-up mountains on the
west showed up dry and arid
barren save for a few scattered
cedars. They were of moderate
elevation apparently about 7200 feet.
Trails visible pointed out the
location of the springs of which I
have heard.

On the Raff River Range to the
north & north-west of Kettle Lake little
snow was visible. Apparently the
peaks in this group go up to
10,000 feet. The actual summits
were hidden in clouds. Cedars
and pines were visible.

Black Pine Mountain stood
out alone rising about 9800 feet.
It was barren with very few
pines & cedars. Curlew Valley
lies on the south east side.

To the East was an isolated
rock on the Greasewood flats
known as monument.

To the south in the lake
lay Fremont, Antelope, Hat,

Stansbury, Gunnison & Carrington
Islands, all plain, visible.

The sky became slightly
overcast with a steady breeze
from the south. A rain storm
passed over the lake.

I returned up through the
marsh to the big and ate
lunch. A party of men were
here for a few weeks engaged
in putting up hay for winter
feed. They were cutting very
grass and tangle grass mainly.
After lunch I worked
up along the Bar M. ^{Baker} slough for
some distance.

The growth was the
same as along the Bar M.
I noted in addition a
few Typha latifolia, Poa grass
(spec.) was common
and there were some Scirpus
Scirpus. Also Phragmites phragmites
Carp have been introduced
into this slough and have
destroyed all the aquatic
vegetation. In contrast between
the barren open channels
here and the Bar M. slough
where water plants were in
abundance.

Strangely enough there are
no frogs in the marsh at
all. I saw one Eutamias and

rattlers are said to occur.
The marsh is absolutely isolated
separated by long stretches from
other marsh areas. With the
lake ten feet higher the springs
would be covered so that
the marsh has been formed by
subsidence of the lake. This would
account for the absence of frogs
& other batrachians would be
unable to cross the barrier areas
between locomotion and other
marshes.

I saw about 150 Mallards
and 15 or 20 Cinnamon Teal but
no other ducks. One of the Cinnamon
Teal was a flapper. Ed Josephson
a ranch owner here tells me
that great numbers of ducks
breed here.

No sick ducks have been
known here. I attribute this
to the fairly fresh water in
the channels and the lack of
stagnation.

I left the springs about
four after taking several pictures
and reached Hutter at six.

Robert springs take their
name from the clouds of steam
that hang over them during cold
weather.

At the Bar M slough a
dam has been thrown across

The spring and water is
pumped out for irrigating
experiments in raising but
have been tried and have
proved successful. But raising
may be interest into on a
large scale which will ruin
the locality for the duck.

August 30, Wednesday.
Clear and warm this
morning.

I worked out north of
Ketter across a grasswood
flat collecting the characteristic
plants. Saw one Jack rabbit
and several Eutamias. Brewer's Sparrow
were common.

Left Ketter about 2:20 P.M. and
reached Corinne at 6:00

Cook met me and after supper
we left for Duckville with an
assorted load of groceries, water
cans and supplies.

We reached the river at Kindred's
without incident and went on down
to Duckville in the small launch.

August 31, Thursday.

This morning early I was
at the laboratory. The day I left
for Ketter the river dropped suddenly
and on the 29th Bosby found
a large number of sick birds
in the area extending from

The Mouth of Ben's Clough to Davis
Island. We estimated the dead
birds seen there as follows

Green-winged Teal	200
Pintail	30
Mallard	50
Wigeon	1
Spoonbill	5
Cinnamon Teal	20
Redhead	25
Lesser yellowlegs	1
Coot	5
3 Tit	1

We brought in about
82 birds all of which were
very weak and more than
half of them died on his hands.
A number remaining in the
pens were very weak. Seven
were dead this morning.

We went down Mr. B
this morning and out Ben's
Clough. There were a few
sick birds here but not many. The
bay was very low and great
areas of mud were laid bare.
We went down through Ben's
Clough. 7 in sick birds were
captured. We returned at
noon and spent the afternoon
at the laboratory in catching
up with routine work and in
starting some new experiments

Aug. 31, 1916.

Original allotment	1000.00
and available Aug. 1	761.82
Total expenditure for August	234.89
unexpended balance	526.93
Estimate for Sept.	<u>240.00</u>

Items August expenses:

Trans. requests	6.40
Booley salary	50.00
Schramm-Johnson farm	2.75
August expense vouchers	<u>175.74</u>
	234.89

September 1, Friday.

~~With~~ This morning we went out 3 1/2 in the launch. The launch was left near the channel to the West and we went in down the flow in the rowboat. I walked along the shore and Bosley took the boat on down. At the lower end of 3 1/2 we crossed to the East shore and walked down as far as Davis Island. From Mud Point to Davis Island was a great area of bare mud and many dead ducks were scattered over it. A few still alive were among them - Most of the living birds were Mallards and Pintails and I consider them so sick from the outbreak of August 29. We secured the following.

Mallard	3
Pintail	10
Common Teal	4
Greenwing	1
Spoonbill	1

This afternoon we banded and released about 15 birds and I continued to work on notes.

Did some work on my August expense account but did not get done.

September 2, Saturday.

This morning early I cleaned things up around the laboratory. About noon with Cook went up to Emancipator in the launch and then in to Corinn in the car.

Met Mr. A. K. Fisher and S. E. Piper at the train at 9:40 and after purchasing a few supplies left at once for Duckville. Piper and I rode for the trailer behind the car. We reached Duckville about noon and after lunch went over to the laboratory. The afternoon and evening were spent in talking over the work.

We banded and released about 30 ducks during the afternoon. I find that it is not advisable to turn out more at a time as the birds beat themselves on the wires when the cage is entered and weak individuals become exhausted.

In the evening I completed my expense account with various vouchers for the month of August for the

September 3, Sunday.

This morning the ducks and various details about the laboratory were attended to at first. About 9 we left in the mudboat for a trip around Lands End. We went down the river crossed through the Neely Canal Canal into the old River Channel and then into North Bay. I steered the boat while Joe Cook was engineer. There was some wind early in the morning which made it disagreeable but later it was calm.

Around Lands End I found large areas that have been dry during the summer. These although cracked are now covered with water. I saw where four or five coyotes had crossed from Hansine Island to the North Shore.

The water around Lands End had a rather evil smell, the color that comes up across the flats with a south wind after a hot day with no wind.

We ran far out to the boat in rounding Lands End in order to escape the stink of dead Scirpus standing in the water.

Returning along the South Shore
we came up as far as Slaughter
Island. There were several
sick Sandpipers (Western) here.

From Slaughter Island we
went south to Klondike.

The water was Saline here
and simply swarmed with
brine shrimp. These lay in great
masses taking advantage of
every depression to keep from
being swept away in the current.
A. brought in a jar full.

Very few sick or weak
ducks were seen on this
trip which used the entire
day. We brought in 10 live
birds. No sick birds were seen
at all on the west shore of
Hansens Island.

Dr. Fisher collected a good bird

September 4, Monday.

This morning we went down
Brown's Overflow in the launch
taking the rowboat with us.
It was a fine clear day
cool and pleasant. The
whole north bay was
covered with birds of all
sorts. Dr. Fisher collected more
Godwits and a Horned Grebe
the first one that I have
seen here. We captured
8 or ten sick birds.

In the afternoon we
banded and released about
fifty ducks. I cleaned out
twenty-five Redheads. Grain
is very high now \$1 30
or more a bushel for wheat
and these ducks eat
enormously so that I cleaned
out all that I could to
cut down on expenses.

Sept 5, Tuesday.

This morning we left at six in the launch for Corinn and reached there about nine after the usual trip up the river. Bosby quit today as he wanted to go to Price Utah and enter school.

I bought various supplies in Corinn, despatched my expense account and attended to other business.

Left Corinn about two and started down the river. I stopped for a few minutes at Myers Grove and collected one, *lincoln's* sparrow. I had expected to find many birds in here but saw practically nothing.

Reached the laboratory about five and had a very time getting things in shape again.

September 6, Wednesday.

Astruc Backett began work for me today. In the forenoon he arranged some experiment pens for me and filled in around the duck pens. In the afternoon he went out being Unghlow and got 13 ducks. I worked at the laboratory all day.

Sept 6, Wednesday.

Cool and clear this morning. Temp. 52° +. The river has come up a little again.

Clear and warm but not too hot all day long. The mountains are now dim with haze.

Sunflowers and Goldenrod are in full bloom.

Was up at six thirty and went over and fed and cared for the birds at the laboratory. I found this a small matter needing only half an hour or so.

There were six or eight Redheads in the racks and one Mallard but I found that all were banded birds. There were about twenty birds in the river nearly all being Redheads.

Fredrick Sackett began work at the laboratory this morning. During the forenoon I had him fill in the Seal and Mallard pens where the birds had been digging. He also put clean salt grass in the Redhead pen. I find that it is well to cover the wire and dirt in the pens with salt grass. ~~to be~~ This may be removed and renewed as needed and takes most of the excrement with it. In this way a sour smell is avoided.

in the pens and a more sanitary condition is maintained.

Fifty ^{young} Redbills require 15 to 17 quarts of mixed grain per day.

The same amount will do at least this time as many adult pintails and Mallards. The latter prefer mixed grain (wheat and barley). Teal will Green-winged and Cinnamon Teal will hardly touch barley but pick out the wheat so that now I feed them straight wheat.

Sackett fixed two boxes to be used in shipping Redbills later. In the afternoon he went out No. 3. He reported very few newly hatched birds. The following were brought in

Green wing Teal	10
Gadwall	1
Spoonbill	1
Mallard	1

He captured 7 Redbills also.

I worked all day nearly in getting up to date on notes and Catalogs. Made a number of dissections.

Nansen came in for a time.

Clyde Webb telephoned in the evening that he had two mallards for me caught on Willis's. I found that they had lead poison.

M. G. Booth of Brigham was down
today. Cook met him at Kundaia's
with the launch. On the way down
Booth wantonly shot a male
Night Heron changing to third year
plumage. It was killed with
a 22 Remington-Union Metallic
repeater. The bird floated down at noon & sunset.
Booth laughed and said that there
was no proof that he had shot it.
I kept the bird and skinned it.

September 7, Thursday.

Temperature this morning 50° .

The day was clear and warm. The air is beginning to get an edge and I find that the water is chapping my hands. I took a bath in the river before breakfast and found it not too cold.

After breakfast with Sackett I went up the river and out Knudsen #1 (Pillars). Clyde Webb joined us. The extreme eastern end of North Bay is almost entirely dry.

We captured 9 Green-winged Teal and one Gimmal all of them being quite strong. 7 or 8 ~~sick~~ dead birds were noted. We picked up two Redheads too, immatures. Birds that had gone down in the shallows.

There were not an unusual number of ducks evident today not one fourth of those that I had noted here on Monday from the mouth of Brown's Overflow. In the evening Mr. Mills at the Chesapeake called me by phone and remarked upon the sudden disappearance of a great body of ducks of all species. He had noted this same phenomenon on

two years at approximately the
same date. Thinking back my
observations coincide with his.
Evidently a large body of ducks
gather in here from Aug. 10 on and
then move out perhaps to
California at this time.

This afternoon Sackett and I
banded 42 ducks. This gives a
total of 197 banded ducks for this
season. 70 of these are Redheads.

We caught four Redheads without
bands in the racks today. Evidently
they continue to pass up the river.

I worked on dissections all
the afternoon.

I have three mallard ducks
in the pens with lead poison now.
These with some that have died
have come from Browns & Kundsens
#1. There were many here last year
too.

Considerably excited over rabies
just now. I carry a club or a
gun at night.

September 8, Friday.

This morning Sackett went out
number 1 and brought back
~~the~~ three experiment pens that I
had out there. He captured five
young Redheads. The rest of the
day he was busy in picking
up experiments pens. Toward
evening we banded and released
a few ducks.

I worked all day in making
dissections and in studying sick
birds.

Un. Deacervine in the laboratory
has been very wet for two
days. At intervals I have
used ammonia gas as a
tonic and think that it has
done some good. Toward night
it became badly choked up
and I found that the exudate
had hardened to cheese like ~~and~~.
I have learned that Epsom
salts with lead forms an
insoluble compound. So have
put the remaining shot poisoned
Mallard in a pen ~~with~~
have given it for drinking
water a solution of 50 grammes
magnesium sulphate in ten quarts
of water. In a short time
the water was turned from
from the focal matter. ~~the~~
the one remaining bird is very

walk. The others that I had
died today.

The Redheads outside are
digging under the redhead pen
and have it badly undermined.
Worked until 11 P.M.

Sept 9, Saturday.

Thermometer at 6:00 A.M. 50° a strong North wind blew all day and I thought for a time in the afternoon that it would snow. The air was keen and piercing.

I wrote and worked on experiments nearly all day. Got rid of accumulated official correspondence.

Barlett joined in the duck pens this morning a big job. In the afternoon he went out $3\frac{1}{2}$ and brought in eleven sick birds. Four of these were lead poison birds (3 mallards & 1 Pintail).

The bird given epsom salts seemed stronger to day. This afternoon it was able to work out of pen of water and go to back of cage. Hoping it could not move. It is so thin however that I doubt if it pulls through. I put four other birds in with and removed the rotation. This time I used 60 grammes of Magnesium Sulphate to 10 quarts of water.

All day there has been much migration among the small birds. Morning and evening I went up, along the willows and collected a few.
Temperature at 6:00 P.M. 40° F

Sept. 10, Sunday.

Temperature 38° this morning
a strong north wind all day.
I worked at the laboratory all
day but was more or less
interrupted by visitors as there
was a crowd at the gun club.
There was some talk of whitening
sink boxes this year. The Bear River
and Duckville gun clubs are willing
to do so but Booth apparently
is not.

I found 74 shot in a Mallard
stomach today which is high
mark. The greatest number noticed
before was 72. These lead poison birds
seem to occur more when the
water is low. The birds that I
have in the Epsom salts solution
continue to do well. Their
excrement is brown in the main.
only occasionally is it tinged with
green. The lead color of
the caeca is a characteristic
sign in post mortem. And mortem
birds may be told from other
shot ducks with duckness by
the fact that the membrana
nictitans remains functional.

Sackett went out Browning
this morning and did not
return until four. I thought
that perhaps he had broken
down so I borrowed Cook's lunch

and went up to look for him.
He brought in about 80
sick birds and reported that
he got all but the more active
ones.

I cleaned a considerable
number of Duck skulls tonight
and after supper worked on
dissections ~~skins~~ & notes
until 9:30

Heavy frost this morning.

September 11, Monday

It was extremely cold last night and this morning at 6:30 I found that ice had formed in some of the pans in the duck pens.

There was a slight breeze during the day but on the whole it was fairly warm and pleasant.

After breakfast Sackett and I went out Brown's. We had time to work only the left fork at the mouth but secured about 40 birds. The greater number of them were Green-winged Teal.

Sunday ~~the~~ strong north wind had driven water in on the flats in the bays at either side of mouth of the conflow. These areas have been dry for some time and when I was here last I noted that the surface was strongly alkaline. It must have been in here that the birds sickened. The water had now receded leaving a few strongly saline pools. I gathered water in these to experiment with.

Not many birds had died here as Sackett gathered so many yesterday.

Saturday night was bright moonlight and there was a

Great flight of Seal in. These
newcomers dropping in very
have been more readily affected
than other larger residents here.

In the afternoon we banded
and released about thirty birds.
This makes a total of 255 ducks
banded and turned out this
season.

In bringing in sick birds
if they are put in the
water directly they die
and immediately become
soaked through. This is very
hard on the birds with the
cold nights now. So today I
kept out all the Seal in a
dry pen in the salt grass.

Some that had been in the
pens overnight were in a pitiable
condition as they were cold wet
and bedraggled. I removed a
good share of them to a dry pen -

Sept 12, Tuesday

Worked at the laboratory all day. Sackett was not here today as he had to go in to work.

~~These~~ night was cold but the day warm. Through flapping out the bird in dry land. Jones lost very last night.

About 9:30 this morning all the strong birds were put in the water. They soaked through at once but came out on the bank and preened and dried themselves in the warm sun and oiled their feathers well. After this they did not soak up at all. It is strange that their feathers lose their power to repel water so rapidly.

I have a considerably still in the dry pens and thus I gave water to ~~these~~ times today. Water was administered by means of a medicine dropper holding about 1 c.c. With Joel I went around twice so that each bird received 2 c.c. After the birds had been seized in the left hand the hand enclosing the head and the thumb and fore finger holding the bill open. The medicine dropper (3 1/2 inches long exclusion

of the bulb) was then pushed
as far down as possible with
care not to injure the oesophagus
and the water pressed out.
The dropper was withdrawn
quickly and the bird given
a second or two to swallow.
I found that it was better to
allow a short interval between
drinks as otherwise the birds
choke so I handled the
whole bunch twice. Really it was
quite a rapid process.

Large ducks received 4 droppers
full.

The river is rising somewhat.
Worked on dissections until 9:30

this evening.

A good many lead poison
birds are showing up now.
These are mainly drake Mallards
with a few harmalos and an
occasional Pintail. The larger part
of them come from Brown &
Rundson #1.

Sept 13, Wednesday.

Cool this morning but pleasant during the day.

This morning Sackett and I worked Willis' overflow and this afternoon I covered the mouth of Barrens. All told we secured 45 ducks.

Many of the teal were very active. I ~~also~~ found them sitting on shore among patches of rush & cockleburrs. Many were able to fly.

2 oz of castor oil will treat 27 small and 18 large ducks. Or in other words it is sufficient for about 60 small or 30 large ducks.

September 14, Thursday

Warm and clear all day.
Every one in Duckville went to
Brigham for "Peach Day" and I
was all alone. Duckett did not
work. Had the table piled high
with ducks so I spent the
entire forenoon working on
them and got changed up.
In the afternoon attended to
the ducks in the pens and
worked on notes & correspondence.
Have about 150 ducks in hand
now all doing well.
By passing the dry land pens
have lost very few.

September 15, Friday.

Er Sackett will not be able to help me any longer for awhile so that I am alone now. Worked at the laboratory all day.

Since Bosley left I have attended to feeding the ducks and carrying for the experiment pigs and found it not a hard job.

September 16, Saturday.

This morning Harry Sackett came to work for me. We took the launch and went out 3 1/2 and then crossed to S. Canghai Point and worked round to Planghtin Island. About three days ago there were a large number of sick birds here as along this shore about 500 lay dead. We got about 45 sick birds.

September 17, Sunday.

Worked at the laboratory all day. Harry Sackett went out Bloom's but found few sick birds. In the afternoon we banded and released a large number of birds.

Sept 18, Monday

Was at the laboratory all day. Sackett worked filling in around the duck pens and prepared several experiment pens for us.

Sept. 19, Tuesday.

Was out Willis's overflow this morning and secured a few sick birds. Worked at the laboratory in the afternoon.

September 20 Wednesday.

Was at the laboratory all day. Banded and released a large number of birds.

September 21, Thursday.

Worked at the laboratory all day. Sackett busy at various odd jobs.

September 22, Friday.

Cool and pleasant this morning warm with a haze on the mountains all day and a heavy wind and rain at night.

This morning I sent Sackett out with the traps. He secured fifteen sick ducks and reported very few dead. The birds that he secured were strong and vigorous.

This morning while sweeping out I discovered that the five gallon can in which I keep alcohol was leaking so transferred the contents to pails. On examination I found eight or ten places where the tin was about eaten through. These Joe Cook soldered for me. Before returning the birds to the can I checked them up and saw to it that all were properly labelled.

Made and stained a number of blood smears and fecal preparations and spent some time at the microscope.

In the afternoon I had Sackett cut out a bed that can be hinged to the wall and swinging up out of the way when not in use. This I shall put up in the store room so that I may sleep over here when the Club opens.

About five a strong wind
came up from the north then
it shifted to the south and
blew with great violence for an hour
or more. There was no smell of
the lake accompanying it however.
Killed a bat in off the flats and
took skulls in part of the laboratory.
At dusk a flock of 50 snowy
geese came down the river low
over the water in shelter of the
willows.

After dark it rained heavily.

Sent the following telegram today.
"Biological Survey etc."

State Game Commissioner Abanto
Thirty banded ducks for exhibit at
State Fair. Birds to be released at
close of exhibition. Am I authorized
to furnish these. Please wire.

Answer received

"Authorized furnish banded ducks.
Birds to be released at close of exhibit
No expense to Biological Survey.
Sigmund Nelson."

Duck Sickness

Several times I have found ^{Sick} Green-winged
Teal in the pens that were soaked
through and chilled with the
cold. They rest huddled up with
the head shaking with cold
and the eyes shut and set. They
pay no attention to me and do
no resent handling.

Sept 23, Saturday.

This morning we went out Brown's Runflow ~~and~~ There had been a ~~long~~ strong South wind yesterday and I expected many sick ones here on expectation that was verified. There were large areas flushed and we captured more than fifty sick birds. Lett quit at short notice this noon.

I started several experiments this afternoon.

September 24, Sunday.

Worked at the laboratory all day. Had a large number of ducks on hand for dissection. I started several experiments today. Will Belnap & family from the mouth of the Weber River were at the laboratory in the afternoon.

September 25, Monday.

I worked at the laboratory all day today. busy mainly with experiments. I had a number of birds with rumps eaten by gulls and these I banded and released before the other ducks attacked them.

In the afternoon I attended
to the ducks again, and
caught up on a miscellaneous
lot of notes.

I have about 258 ducks now
and am feeding 24 quarts of
grain per day. I wish to band
some more but can get no labor
at present.

I am still using dry land
pens for water ducks and find
them a success. It takes a
little time to give the birds
water with a syringe but not
a great deal. The birds recover
rapidly too. This morning I
had three dozen dead in one
pen. I put six or eight in the
water leaving those that were
unable to move about at noon.
There were six more that were
able to stand.

The pintails that I got
yesterday were hard hit and
I have lost eight out of
sixteen. I brought the remaining
birds to the laboratory in the
evening.

In giving water with a syringe
to dead or dying birds the bulb
should be squeezed slowly. Although
the water may run back and
cause them to choke.

Many birds choke through
the dropping of the Nucleus
excreted from the choanae into
the ~~trachea~~ larynx. This bird raises
the head to the length of
the neck and from the bill
with each inspiration. I find
that with these birds it
is often beneficial to hold them
head down when the fluid
runs out rendering breathing
more easy. Sometimes a
slight shake aids in this.
With very weak birds at
the laboratory it is sufficient
often to depress the head
until it hangs over the
edge of the table.

Set Duck Booth came
along and said that his
bird family had broken down
so I went out and towed
them down to Sackett's.

Cook went to Corning today
with flatboat. I ordered some
lumber for shutters for the
laboratory windows.

Engaged golden Sackett to
help me tomorrow.

nearly all of them strong and vigorous.

The Hogs were still running at the mouth of Browns but kept out of our way.

But now James Knudson game warden came down and after dinner we gave him 50 ducks to send down as an exhibit to the State Fair. These birds I banded and turned over with the understanding that all were to be released at the close of the exhibit. I included in the lot a wing tipped Bluebill, a broken winged Pintail and two Redheads that are to go to Liberty Park.

Afterward we picked out five pairs of Redheads to send to Col J. C. O'Connor, Virginia Beach Virginia for breeding purposes and then I banded and released the others & gave three or four that I put in with the Mallards.

September 28, Thursday.

Clear and cold this morning with a sharp north wind. Breakfast was late so I pulled out without any. With Golden Sackett I went up the river and out Kendall #1. The water is raising and there is a very swift current in the overflow and main river.

There were large numbers of teal in the overflow. They rose with a great roar of wings. We secured very few sick birds here and the country is practically clear of them.

~~P~~ Pools newly formed on the flats were bitter with the salts in solution. I picked up one sick snowy plover.

Returning I went out the Kendall Canal. There were a few sick greenings here in the side bays. Most of them were very weak.

Returning to the laboratory we banded and released a number of ducks in the afternoon. I still have 150 or so on hand.

Duck Sickness

Sept 28, 1916.

I have two Green-winged Teal now that are very seriously affected. The poison seems to have broken down the control of the motor nerves so that the birds seem almost palsied. Movements are abrupt and uncertain and there is poor control of the head. The birds attempt to drink and preen but with each attempt the head shakes wildly with little or no control. These birds can stand but in walking are prone to rear and fall over backward or to turn around in circles.

On rest the head is drawn in on the neck and is turned so that the side of the head points up.

Any sudden movement or noise starts the palsied trembling.

September 29, Friday.

This morning with Golden Sackett I went out Brown's Clough. The water is very high now. We secured 8 or 9 sick birds. In the afternoon we banded and released a large number of Ducks and started several experiments.

September 30 Saturday.

Golden Sackett worked for me until noon today. We banded and released all the chicks on hand save about 30 Seal that I kept for further experiments. I started several lead experiments this afternoon.

Hunters began to pass going to Booths this afternoon and autos continued to come down until late at night.

Improving the shooting season goes. I worked some on my expense account this afternoon.

Statement October 1, 1916.

Amount available Sept 1	\$526.93
Total expenditures for Sept.	<u>191.10</u>
unexpended balance	335.83

Estimated expenditures for October	180.00
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Items in September expenditures	
Bosley Form 3	8.33
Ex Sackitt	18.00
Expense Voucher	<u>164.77</u>
	191.10

Es Sackett

Time

September 1916

6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
+ + + + + + + 0 + 0

Harry Sackett

Time

September 1916

+ + + + + + + 1/2

Golden Sackett

Time

September 1916
+ + 1 1/2

October 1, Sunday.

Rain began this morning and continued all day.

Eight men shooting at the Duckville Gun Club. About 550 ducks were brought in to the Duck house. Nearly all were large ducks. Some of the guides were complaining because the hunters would not kill teal but waited for large birds.

A good many are shooting at Scalets too.

October 2, Monday.

Rain still continued all day today. The flats are covered with water. I have a bad cold and have remained in ~~for~~ ^{much} ~~the~~ to day. Every thing is damp and disagreeable. I have a fire in the stove constantly. The path to the Clubhouse is a sea of mud. Went to Corinne & return in forenoon & got off my monthly payments.

October 3, Tuesday.

Rain continued all day today. This is one of the most severe storms known here for years. Some water bats in around the windows and under the door but the roof is tight and I am very comfortable. Shooting is not so good today. Teal, Pintail and Sparrows have spread out

to feed on the flooded flats.
Flocks of 2000 swirled past the
laboratory and out over the barriers
all day long.

Birds released about 30
chicks this afternoon. Employed
New West to help me.

October 4, Wednesday.

Went in ~~to~~ to Corinne on the
Dart this morning. Rain continued
for part of the forenoon and then it
cleared. The river has risen rapidly.
Left Corinne at 9:41 changed at
Brigham and reached Ogden about
11:00 a.m. Registered at the
Marion Hotel.

Saw Mr. Bigelow afternoon for
a few minutes and bought supplies
and did various errands about
town.

October 5, Thursday.

Went to ~~the~~ Salt Lake City this
morning on the valley line. Clear
and rather cold this morning.

Saw Mr. Chambers, State game
commissioner and talked with
him concerning Duck sickness,
abolition of sink boxes & non sale of
game.

Had lunch at Fisher & Rogers
cave & talked with both those gentlemen.

After noon visited the State
Fair grounds and saw the ducks
that I had sent down to Chambers
for exhibition. They were in an
enclosure 6 x 15 feet with an
abundance of water. I was
interested in noticing that they
paid no attention whatever to the
crowds without but swam, preened

or slept apparently without a thought of fear. I believe that a juv. have been in transit. I missed the Bluebill that I had sent down. Chambers however said that all were in good condition.

I spent the evening with Mr. & Mrs. G. W. Ireganga at 614 East 6th South Street and had a very pleasant time. Mr. Ireganga has a magnificent collection of birds eggs from all over the world. There are probably 30000 specimens & about 750 species & subspecies of North American Birds were represented. An addition were a great many foreign species which were of great interest to me.

Left Salt Lake City at midnight reached Ogden at 1:15 A.M.

October 6 Friday.

Was up at 6:15 this morning packed up, had breakfast and left for Corinne at 8:30. Quite hot this morning but clear. Reached Corinne at 9:40 and left at once in the launch for Duckville. A light shower fell. The river is very high. In fact it is now about at spring water level. I saw quite a number of ducks along the river.

Near the Chesapeake were several
cripples. Several dead ducks
among them a Ruddy and a
Redhead were seen floating in
the water.

Found everything at the
laboratory in good condition. Joe
Cook has cared for the few ducks
still on hand during my absence.
Spent the afternoon in straightening
up and clearing up the
numerous details that have
accumulated during my absence.

October 7, Saturday.

Worked at the laboratory all
day today. Clear and sharp.
Since October 1 I have slept
in the back room at the laboratory.
Have made a folding bed that
raises against the wall so
that it takes up very little room.
I have a feather bed in it and
it is very comfortable.

Saw Mr. J. C. Hurley of the Bear
River Club this evening.

October 8, Sunday.

Clear and very cold last night
drew a quarter of an inch that
froze in a pool standing on a
piece of canvas. Clear today.
The flats are still flooded with

October 12. Thursday.

Worked at Laboratory all day today staining & mounting sections. Have made a small carrying case for 22 mm cover glasses so that I can carry a supply in the field and secure blood smears from trapped birds.

October 13, Friday.

clear and fairly warm all day today. With E. Sackett I went out Channel 1 and crossed to Bayliss Island for the purpose of ~~lifting~~ ^{sifting} for stront. Bayliss Island is a small ^{circular} ~~round~~ island (Scirpus ~~paniculatus~~ growth) about 30 feet in diameter. It is said to have been the site of a blind sack shooting season for twenty years or more. Thousands of shells have been fired from it. From its location the flight of ducks must have come in from the southwest west and northwest. We chose a line a little north of west and began work. The first sifting was done at 30 yards from the island shore. Subsequent stations were chosen at 20 yard intervals up to 210 yards. Three sieves were sifted at each station. Each sieve held approximately 10 quarts of mud. Each sieve full was in most cases taken up at one or two shovels full and ~~two~~ two thirds of each one came from the upper six inches and $\frac{1}{3}$ from the next lower six inches. The sand was fairly fine so that in walking I sank in five inches. At 170 yards a sand bar was found.

Following ^{distance} are the results.

number	distance	no of shot
1	30 yards	0
2	"	0
3	~~30~~	0
4	50 yards	0 (taken 1-4 inches deep)
5	"	0 .. 4-8 ..
6	"	0 .. 8-12 ..
7	70 yards	0
8	"	0
9	"	1
10	90 yards	0
11	"	3
12	"	1
13	110 yards	0
14	"	1
15	"	5
16	130 yards	3
17	"	1
18	"	3
19	"	0 (taken 1-4 inches deep)
20	"	12 .. 4-8 ..
21	"	3 .. 8-12 ..
22	150 yards	4 .. 4-8 ..
23	"	0 ..
24	"	2 .. 1-4 ..
25	170 yards	2
26	"	1
27	"	2
28	190 yards	0
29	"	1
30	"	1
31	210 yards	0
32	"	0
33	"	1

The shot were found at 70 to 210 yards from the blind and seemed more abundant at 130 yards.

After finding no shot in the first 8 screens as a test I placed 10 number six shot in screen # 9. All ten were recovered without trouble. Though many seeds of *Potamogeton* etc and ~~other~~ vegetable matter accumulated in the bottom of each screen there was no difficulty in picking out the shot as they were seen at once.

The shot recovered were all somewhat corroded and with few exceptions were much battered, scarred, flattened or even square. The bulk of them seemed to lie at from from 4 to 8 inches from the surface.

On screening I used a frame of two by four material one end of which rested on the boat while the other was supported by two legs. The sieve was placed on this and filled with mud. I poured water in with a bucket while Backett worked the mass with one hand.

About two or two thirty we finished and then crossed to the fourth island in East Pass and shot until five. I killed one Mallard, 1 gadwall, 2 wigens, 6 Spermills

October 15 Sunday.

This morning there was an exceedingly heavy dew. A. O. Ireganga and A. W. Boyle of Salt Lake City were down today. They came to Kunda in Ireganga's motor cycle and I met them with the launch. We were at the laboratory until noon and banded and released eight or ten ducks. One female pintail flew up the river and was killed at the Bear River Club within an hour.

After a camp fire dinner at the laboratory we went out No. 2 in the launch and the back and out Brown's Overflow. No sick ducks were seen at all. A few cripples noted. I saw as gos had to be missed it. Shot a female Bufflehead.

They left about four.

Had trouble with the engine returning. Account dirty gasline. Cleaned out the line & tank & borrowed gasline of Hillhouse who passed with Booth's launch.

Learned from Dr. A. C. Beale that a banded duck had been killed recently at Mud Lake Idaho. Also that Atropine would serve to relax the pyloric sphincter in birds.

October 16 Monday.

Clear and quite cold this morning. Leaves on the willows are turning rapidly and many as they yellow come down.

This morning this Sackett of went out $3\frac{1}{2}$ and down the inside channel to Bigelow's Point. Here we continued the work of sifting for shot. At Bigelow's Point I blind has been located on one small island for 20 years or more. In addition a second blind two hundred yards south has been used for the same length of time. The flight here is from the south and east. We worked out southeast from the Bigelow Point blind. ~~and~~ Our first station was at 30 yards and then we stopped at each succeeding 20 yards up to 230 yards. This line carried us out in territory covered by shooting from both the blinds mentioned above. In addition Boat blinds have been built all over the bay here. ~~and~~ The shot did not show the distribution noted at Bayless Island but this I attribute to the boat blinds. We were still securing an abundance of shot up to 230 yards where we stopped.

The mud here was soft and

up the bay then then are
star hunted. I found that
shooting from the sink boxes
made (man) the birds
scary and wild. After seal
would swing up from below
where they seemed to have
been shot at, would circle in
toward the decoys and then
dart out again. Other birds that
came in from the east came in
the decoys readily. No large
ducks would come near me at
all.

Oct 17. Tuesday

Last night I received word of sick birds in the Boca lake region Oregon about 30 miles south of Lake Malheur. Wrote the office to learn if it was advisable to go there. I spent the forenoon at the laboratory in clearing up a lot of work that had to be completed before I could leave.

Received a letter at noon asking if exigencies etc. demanded the trip and stating that a good habit authorization would be necessary. As there was no time to await a new authorization I replied that it would be better to abandon the trip.

Warm today with rain threatening. I marked two large boxes of alcoholics & took them over to the wharf so that they will leave tomorrow on the launch.

Examined the intestines of the ducks shot yesterday critically. I found that two the greenings showed considerable irritation. The others were clear. Some of the healthy ones were quite firm & hard so that I consider that character of little value.

October 18, Wednesday.

Before daylight this morning came a light fall of rain. By eight the clouds began to clear and by nine the sun was out. The wind hung in the north all day and by four in the afternoon it was extremely cold.

At the laboratory I worked during the forenoon on experiments and also paraffined a large number of small vials containing alcohols. In the afternoon I went up to the Grand River Club and purchased half a bushel of wheat from Vince Davis at the rate of \$1.50 per. Hunter's report quantities of Mallards in the East Pass country.

It is said that there are quantities of Bluebills, Redheads & Canvasbacks in the Chesapeake but no shallow water ducks.

I was strongly tempted to go out shooting today but finally thought better of it and stayed in. Frank Larson told of an enormous Mallard flight in the East Pass country.

October 19, ~~Wednesday~~ Thursday
 Last night was extremely cold
 and this morning there was a
 strong north wind. Ice froze three
 eighths of an inch thick on standing
 water. I was interesting in
 noting that in small pans
 in which Redheads were imprisoned
 that the water in the pans while
 a mass of slush had been kept
 open by the ducks. While in others
 containing Mallards & Pintails the
 pans were frozen solid. This
 illustrates difference of habit in the
 birds very well.

This morning I went out
 in the marsh with Will Neal
 from the Bear River Club. We went
 down Channel 2 and crossed to
 Number 1 Island at the head of East
 Pass.

There was quite a flight of
 birds and we killed 41

viz		
Mallard	2 (♀)	2
Pintails	(♀)	10
"	(♂)	4
Gadwall	♂	2
Bergers	♂	2
Green-winged Teal		8
Spoonbills		13

The predominance of females
 over male pintail was
 remarkable.

Hunters say that there are more
ducks this season than any
year for five years past.

The day was pleasant as
the wind moderated and the
sun shone warmly. Shooting was
good and we had a enjoyable time
of it.

With a level shoreline covered
with alkaline efflorescence raising
from 1 to 4 inches above water level
of a lake or pool the following condition
might occur: Suppose that a
gale of wind blowing 20 to 30 miles
per hour carried water out
across the flats. It would advance
slowly a foot to a minute perhaps
or even a yard to a minute. Progress
would be by a series of little
waves that lapped over the
efflorescence covering it and take it
into solution. Might it not well
be that the $MgCl_2$ present
would be absorbed more rapidly
or in greater amount than
other salts thus surcharging the
advancing water line with this
poisonous chemical. Birds following
to feed eagerly here would
inevitably be poisoned.

October 20, ~~Thursday~~ Friday. Friday
Very cold last night again
Clear today. Worked at the laboratory
all day. The glass slides that
I can buy in Salt Lake City are
no good. Sections refuse to
stick to most of them.

~~October 21 Friday Saturday~~
~~Also busy - at the laboratory~~
~~all day again today~~ There is
a heavy frost every night now
but still the leaves hang
in the willows.

About six with Es
Sackett I went out 3 1/2 with
the launch and then crossed
in the rowboat to Slaughter
Island. We reached the
island at dark. The air was
sharp and cool. We cut
a quantity of tule and
piled them on a slight
elevation at the south end
and put our bed on this.
After a light lunch we
turned in about eight.
The night was dark but
the stars were clear and
bright. Ducks were quacking
and feeding all about, flocks
of avocets came in to roost
and numbers of Snow geese
kept calling from the shore

behind Miley's Island. My
bed was soft and warm and
I was soon asleep.

October 21st ~~Friday~~ Saturday

Was up this morning at
4:40. A damp chill was in
the air and the wet tarp
was heavily covered with frost.
Boots and other things left
out were likewise coated. After
dressing I chanced to turn
a pocket jack light out to the
east twinkling at four or five
times. All the ducks and geese
within half a mile rose with
a roar of wings.

We rowed south and
west beyond the short lake
Island until we came to water
over knee deep. By this time day
was breaking and we could
see small flocks of Bluebills flying
getting in their line of flight.
We built a boat blind of
willows and reeds working as
fast as cold fingers would
allow. By ten o'clock we
had 12 Greater Scaups. The
flight was slow and not
many birds were in. About
ten thirty they refused to decoy
so we pulled out picked up
our bed in Slaughter Island

and set up for a shoot
in Slaughter P. Ent. There was
a good flight of Quail here and
I killed one number.

Returning we had some
trouble as the shot ^{was} lost
on the launch but finally made
it.

I had only a light
breakfast and no lunch today
so was enormously hungry
tonight.

October 22, Sunday.

Cold and sharp all day
today. I worked at the laboratory
all day. Skinned nine Bluebills
among other things. Two I had
picked and found them excellent
eating. Had Sackett working today.

October 23, Monday.

Began packing and cleaning
up in earnest today. Sackett
worked with me all day. Cold
at night but warm during the
day.

October 24, Tuesday.

Finished packing and cleaning
up today. Put many shutters
on the windows. All the
duck pens were stored in the
Halls on the open veranda.

It was quite a job to get
the four large jars out of the
river as they were not fast
in the mud.

In addition to packing I
have been carrying on a final
series of experiments. I liberated the
last of my ducks today.

Articles stored at laboratory.

- 1 box shells # 8 shot 16 gauge
- 2 " " # 6 " "
- 9 pt mason jars flat top.
- 2 pt. " "
- 10 2 qt. " "
- 10' shingles mouse traps
- 12 Out 6' sight " "
- 1 meat grinder
- 1 ax
- 1 saw
- 1 hammer
- 1 dipper
- 1 10 gal. water can
- 1 5 gal gas. can
- 3/4 sack bran
- 3 lin. ft 3' gal. serum
- 9 12 qt galv dist. pans (worn)
- 7 12 qt galv pails (1 n.g.)
- 1 gal. camteen.
- 1 gal. alcohol.
- 3 galv. pans (small)
- 1 lb. absoluti alcohol.
- 1 lb Formaldehyde.
- 1 can chloride lime.
- 1 lb CaCl_2
- 2 16 oz. flasks
- 6 8 oz. "
- 1 1000 c.c. graduate
- 1 125 " "
- 6 breakers acid sizes
- 1 pottle & mortar
- 1 iron stand & 2 rings
- 1 glass funnel.

- 1 8oz alc. lamp
- 1 bell jar
- 4 small glass funnels
- 15 towels (1/2 badly worn)
- 1 duffin
- 1 wash basin
- 1 stone (personal)
- 1 water kettle
- 1 dust pan
- 1 broom (n.g.)
- 1 mop
- 1 brush
- 2 qts white paint
- 2 qts gray "
- 12 platforms 4x7 ft.
- 3 6x4x12 pens 1" mesh
- 1 6x4x12 " 2" " (n.g.)
- 7 3x3x6 " 1" "
- 2 3x3x5 " 1" "
- 3 3x3x5 " 2" "
- 1 3x3x4 " 2" "

October 25 Wednesday
Left Duckville this morning
at 7:00 and reached Corinne
at 9:15. Left Corinne at 9:40
Arrived Ogden 11:00 a.m.
Registered at Marine Hotel.
Cleaned up and after lunch
called on Mr. Bigelow. After
various errands around
town occupied the afternoon.

October 26, Thursday
Was up this morning at
seven and after breakfast
went down along the Weber river
for a time. The morning was
sharp and cold. I had a
saw shot at Duckville
with me and this I skinned
and dissected, sitting on a
log and using an old box
for a work table. I preferred
doing it outside rather than
work in a dark room at the
hotel. The sun was warm
and comfortable today and I
enjoyed being out. There were
few birds about and I saw
little of interest ornithologically.
I followed out farther than
I have been before to where
the river turns in coming out
of the mountains.
There is a considerably

much of water in the
stream now and the
mouth should be well covered.
I looked carefully for water cuts
but saw none.

Noticed that *Chamaea* was
common. It seemed very good
to be out among trees and
on fresh green grass again.

October 27, Friday.

A fine clear day. Left at 9:30 for Salt Lake City arriving 10:45.

Called on Mr. L. B. McCormick but found him out of town. Learned too that M. A. Kuyper is not in.

Had lunch with A. O. Dreganya and then called on W. H. Finch president of the Duckville gun Club. He expressed willingness of the club for continuance of the work in Bear River. Met Sam Sharrow in there also.

Called on Dr. J. M. Dart.

After this I went up to the Capitol and saw F. W. Chambers State Fish & Game Commissioner. He asked me if I might write a letter or letter in his behalf to Upham Morris republican candidate for Governor in case of his election. He said that I might do this personally but hardly thought that I could official. Told Mr. Chambers that I would talk with Dr. Fisher concerning it. Chambers is establishing Fish & Game refuge through the State with the aid of private individuals. He says that the Democratic candidate for Governor has threatened to do away with the office of Fish & Game Commissioner entirely. I met Prof. Paul a rank protectionist, unfit for the place may get the position.

Having a few minutes to spare
dropped in to a Shepherd's bookstore
and bought a copy of the book of
Mormon and the life of Richard
Dwight in two volumes (the latter
for \$2.00)

At five I found Mr. G. L.
Treganza in his office and went
home with him on his motor
cycle. A very pleasant evening
with ~~Mr. G. L. Treganza~~ the
Treganzas with Mr. Boyle
stopping in later. Mr. Treganza
described a bird with white
eggs unknown to him. That I
suspect is an Aimophila.

I was interested in comparing
sets of the Stephens & Eastern
Whippoorwill. On Sytochalcis
voeifrons the eggs are dull white
marbled with lilac. On S. v.
macromystax the eggs are dull
white unmarked and have the
shape, size & appearance of
eggs of Phalaenoptilus. The resemblance
to the last is striking and save
for the well known rhyacity of
the collector F. C. Willard might
cause a query as to the identity
of the eggs.

Mr. Treganza has just secured
a fine series of Asphy eggs.
Left Salt Lake at 10:00 hrs.
Ogden at 11:15.

October 28, Saturday.

This morning I repacked my outfit
secured pullman reservations and
purchased a ticket for Washington
via U. P. Co. N. W. & B. O.

Saw Mr. A. P. Bagelow. He
outlined the plans made for a
dike across North Bay to be placed
just east of Swiford's Point.
Also that the Bear River Club
claimed the section on which they
have pined. And that they
will own sections surveyed in
South Bay when surveyed.

Left Ogden at 3:10.

Mr. J. H. Becker of Ogden on
board. Had dinner with him.

October 29, Sunday.

A fine clear day. Was with
Mr. Becker a good deal today.
He left the train at Omaha.

Oct. 30, Monday.

Reached Chicago 11:30 A.M.
Had lunch and then was
at the Field Museum for an hour or
so. Saw Com. Dagoberto Gerhardt.
Left Chicago via B. & O. 5:45 P.M.

Oct. 31, Tuesday.

Arrived Washington 4:45 P.M.

Expenditures Oct. 1916

Amount available at begining of month	335.83
Total expenditures	234.64
unexpended balance	101.19

Items of expenditure	
Expense vouchers	123.41
Transportation requests	70.23
Sackett Form 3	27.00
Schramm Johnson Form 5	2.30
Orrland Lumber Co	<u>11.70</u>
	234.64

E. M. Sackett

Line October 1916

13 14 15 16 17 18 19 20 21 22 23 24

1 1 0 1 0 0 1 1 1 1 1 1

Launch

October 1916

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

1 1 1 1 0 0 0 1 1 0 1 1 1 1 1 1 0 1 1 1 1 1 1

1 1 1 1
cook.